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SCHEDULE OF MEETINGS

8-13 April	**Expert Committee on Yellow Fever Vaccine, Geneva**
25 April-3 May	**Seminar on Mental Health of the Sub-Normal Child, Oslo**
25 April-4 May	**Joint WHO/ILO Seminar on the Nurse in Industry, London**
7-25 May	**Tenth World Health Assembly, Geneva**
27-31 May *	**Twentieth session of the Executive Board, Geneva**
12-15 June	**Sub-Committee on Non-Proprietary Names of the Expert Committee of the International Pharmacopoeia, Geneva**
17-24 June	**FAO/WHO Expert Committee on Food Additives, Geneva**
24-28 June *	**Study Group on Histological definitions of cancer types, Oslo**
27 June-5 July	**Conference on Health Education of the Public, Wiesbaden**
15-20 July	**Expert Committee on Poliomyelitis, Geneva**
25-31 July	**Technical Conference on Insect Resistance**

* Approximate dates

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NEW IDEAS ON THE BIOLOGY OF THE TREPONEMAL DISEASES

Until only a few years ago the treponematoses were thought to differ from all other infectious diseases, since the process of immunity seemed to be subject to different biological laws.

The results of many years of research, especially the investigations carried out at the International Treponematosis Laboratory Center, have changed this outlook, by showing that these diseases are not fundamentally different, since they do, in fact, give rise to reactions of the same nature in the infected organism. In a monograph [1] recently published by WHO, Professors T. B. Turner and D. H. Hollander have assembled the results of this valuable experimental work on the biological processes of the treponematoses, stressing particularly the most poorly understood and sometimes most disputed aspects.

In 1950, the International Treponematosis Laboratory Center was set up in the Department of Microbiology of the Johns Hopkins School of Hygiene and Public Health, Baltimore, Md. The work of this laboratory now forms part of WHO's programme for the co-ordination of research in treponematosis control.

Some of the subjects dealt with in the monograph are briefly reviewed in the following pages.

Syphilis and yaws have been recognized for over 400 years as distinct disease syndromes. Their relationship was suspected well before 1905, when the etiological agents, *Treponema pallidum* and *T. pertenue*, were discovered. Syphilis, yaws and pinta (whose relationship to the first two diseases was only recognized later) constitute perhaps the most clear-cut entities within the treponematosis group. Allied infections, which have not as yet been so extensively studied, are the endemic syphilis group of diseases contracted in infancy. These diseases are known by various names—for example, bejel, which is found among the nomadic tribes of the hot, dry regions of Asia Minor and the Eastern Mediterranean; endemic syphilis, in certain parts of the Balkans; dichuchwa, in Bechuanaland and adjacent areas; njovera, in Southern Rhodesia; and siti, in Gambia. It is also interesting to note that naturally occurring venereal spirochaetosis of rabbits is biologically related to the human treponematoses.

Over the years research workers in the International Treponematosis Laboratory Center have isolated some 76 strains of *Treponema* (39 strains of syphilis, 20 of yaws, 3 of bejel, 8 of endemic syphilis, and 6 of venereal spirochaetosis of rabbits). These strains have been compared from the clinical, serological and immunological viewpoints. While recognizing the need to exercise caution and judgement in translating the results obtained with animals into terms of the disease in man, the authors have nevertheless suggested interpretations of the experimental findings which throw light on the clinical and epidemiological problems of the human treponematoses.

The experimental disease

The fact that it is still impossible to cultivate treponemes in vitro limits the scope of the experimental study of the metabolism or the antigenic structure of these microorganisms. The investigations described in this monograph were carried out with the rabbit, an animal which has long been used in experiments on this group of diseases. The authors also employed the hamster,

[1] Turner, T. B. & Hollander, D. H. (1957) *Biology of the treponematoses*. Geneva (*World Health Organization: Monograph Series*, No. 35). Price: £1 10s., $6.00, or Sw. fr. 18.—

which, in addition to being free from any natural treponemal disease, has the advantage that after inoculation many of the treponemes may persist in the lymph-nodes. Moreover, it presents reactions to the disease which have not so far been seen in any other animal.

Treponemes isolated from all the main forms of treponematosis produce similar experimental lesions. A relatively small number of treponemes—perhaps even only one—can produce infection. Multiplication occurs at a regular although comparatively slow rate—in logarithmic progression after 24-48 hours—leading to the production of a mass of treponemes, which cause a visible lesion. There is a linear relationship between the number of treponemes (Nichols strain of *T. pallidum*) and the incubation period in the rabbit. With an intradermal inoculum of 500 treponemes, the incubation period is approximately 17 days. With a tenfold increase in the number of treponemes inoculated, this period is shortened by about 4-5 days. A generation time of 30-33 hours for *T. pallidum* can be computed from these data.

The authors were able to establish a correlation between the development of the clinical disease in rabbits and the accompanying histopathological changes. The initial stage is characterized by the production of a mucoid material identified as hyaluronic acid. In a second stage there is an infiltration of mononuclear leukocytes, followed in a third stage by an influx of polynuclear cells, probably as a reaction to necrosis or to secondary infection in the lesion.

It was found possible to divide the strains of treponemes into three categories, according to the lesions observed in the rabbit and in the hamster and certain immunological patterns in the former animal.

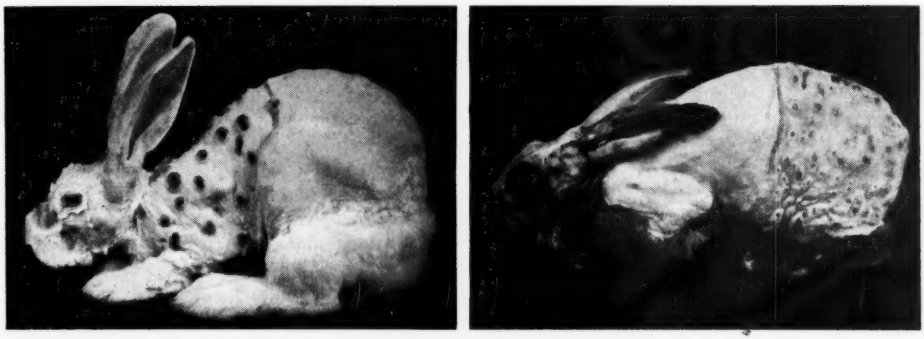
The S-type includes most of the strains isolated from patients suffering from venereal syphilis, and in rabbits it causes indurated lesions at the site of inoculation. The Y-type comprises most of the yaws strains and causes only minimal changes at the site of inoculation in rabbits. The M-type includes most of the strains isolated from cases of the endemic syphilis group of diseases, and in rabbits it causes reactions intermediate between the S-type and Y-type reactions. Other differences in response between organisms of the three types are found at the sites of inoculation in hamsters. No serological differences have been discovered between these types, which evidently have common antigens.

Influence of various factors on experimental infection

The more or less precarious balance between the parasite and host may be influenced by various factors, among which the authors studied more particularly temperature, hormones and antibiotics.

Temperature. It appears that 35°C is the temperature most favourable to the development of treponemes. Temperatures even only slightly higher are unfavourable, and at 40°C the treponemes are gradually destroyed. At temperatures below 30°C they multiply slowly, if at all. The influence of temperature seems to be very important and may even be considered decisive in the localization of treponemal lesions. Thus, in the rabbit, whose internal body temperature is normally about 39°C, lesions of the internal organs are rare. On the other hand, the ears, skin, testes and extremities, whose temperature is lower, are the preferential sites of either primary or metastatic lesions. The fundamental role of temperature in this group of diseases is commented on by the authors as follows:

" One can only speculate concerning the effects of long-continued environmental temperature on the treponematoses in human beings. It can be deduced from these studies on the experimental disease that consistently high environmental temperatures such as are met with in the tropics, which in turn account for slight but definitely higher skin temperatures, may have a slightly adverse effect on treponemes infecting individuals inhabiting the areas concerned; and this thesis can



The effect of temperature on treponemal lesions is clearly shown on experimentally infected rabbits. In the rabbits shown, an intravenous inoculation of treponemes was given and one half of the body was then shaved—the anterior half on the white rabbit and the posterior half on the black. Lesions did not appear on the part protected by fur, which has a higher temperature. (The rabbits were entirely shaved before the photograph was taken).

reasonably be extended to visualize a substantial modification of those strains of treponemes, after years and years of exposure, towards a less virulent variety. Carrying this idea a step further, it may be postulated that treponemes of lowered virulence likewise provide a lesser antigenic stimulus to the host. This in turn may account for poor development of the immune response, with a tendency to chronicity and relapse over a period of many years."

Hormones (cortisone). The well-known effects of cortisone, such as the suppression of inflammatory tissue reactions and the stimulation of the growth of numerous bacterial species in the body, were also observed in experimental syphilis. In animals which have received cortisone there is a tremendous over-growth of treponemes in both initial and secondary foci. At the same time, hyaluronic acid, whose transformation appears to be inhibited by cortisone, accumulates in the lesions, which lose their typical firm, often stony-hard characteristics and become soft and spongy. Phagocytosis is inhibited by the presence of this mucoid material, which also opposes, at least partially, the penetration of antibodies, in so far as the production of the latter is not suppressed by the cortisone.

Experimental use has been made of the properties of cortisone to obtain the large numbers of treponemes that are necessary for the preparation of treponemal antigens.

Antibiotics. Fortuitous contact with antibiotics may also have an influence on the host-parasite relationship. It is, in fact, extremely difficult under present-day conditions to isolate either experimental animals or man from the effect of antibiotics. Foodstuffs may contain antibiotics, particularly if they include milk or meat coming from animals which have received antibiotics as part of their normal diet. It is interesting to speculate on the extent to which the treponematoses may be affected by the widespread use of antibiotics. In the authors' opinion, it is not "... altogether fantastic to postulate that even before antibiotics were discovered some of the geographical and epidemiological peculiarities of treponemal disease may have resulted from antagonistic bacterial or fungal flora in certain areas of the world ".

Immunity

The treponematoses, in particular syphilis, were long considered to occupy an exceptional place among the infectious diseases. The chronicity of the disease, and the

impossibility of detecting the presence of antibodies in man or infected animals, led to the supposition that resistance was closely linked to the presence of treponemes and that cure brought about the disappearance of resistance.

The work of the International Treponematosis Laboratory Center, following that of Chesney, has shaken these ideas by showing that immunity phenomena in the treponematoses are similar to those in other diseases, and that, in the rabbit, immunity, when once established, persists long after the elimination of the infecting organism. The treponemes induce the production of specific antibodies; human or animal syphilitic serum, when added in vitro to virulent treponemes, prevents the development of the disease in inoculated animals. These fundamental experiments, carried out in this laboratory, were the origin of the treponemal immobilization test (TPI test), which detects an antibody differing from the so-called Wassermann antibody (reagin). In most cases of treponemal infection, in fact, the two antibodies coexist. The presence of antibody-immobilizing treponemes indicates present or past treponemal infection. This antibody plays an important role, although not an exclusive one, in the immune process. The TPI test has been of great help to serologists in the diagnosis of syphilis and in the detection of biologically false positive reactions, and has many possible applications in other fields of pathology.[2] However, the technique is still too complicated for the test to be generally used. An attempt is being made to simplify it and to develop other tests, based on agglutination and adhesion phenomena.

Response to chemotherapy

None of the more recently discovered antibiotics is as effective against treponemes as penicillin. Nevertheless, some of them —for example, Magnamycin—have a definite therapeutic action. When penicillin and Magnamycin are used together they appear to exhibit an additive effect. As regards Aureomycin (chlortetracycline) and Terramycin (oxytetracycline), doses 100 times larger than that of penicillin are necessary to obtain the same results. Nevertheless, it is important to determine the therapeutic activity of antibiotics other than penicillin, since it is always possible that their use may become necessary if some strains of treponemes develop resistance to penicillin. This is an eventuallity which cannot be absolutely excluded, although penicillin has been in use for 10 years without such resistance making its appearance. Furthermore, an increasing number of patients are becoming hypersensitive to penicillin and some attempt at avoiding the consequences of this may become necessary.

The antibiotic role which fungi and bacteria may have played in the evolution of the treponematoses in certain parts of the world during the course of the centuries has already been mentioned. In the same connexion, it is possible that the widespread employment of antibiotics for the treatment of non-treponemal complaints, their use to stimulate animal growth, and their presence in foods derived from such animals may have long-term repercussions on the epidemiology and even the clinical features of the treponematoses. The authors express the opinion that, " in view of the wide range of antibiotics that have some bactericidal or at least some inhibitory effect on treponemal infections, it is probable that these diseases in man are continuously being subjected to minor therapeutic effects. What role this may play in their control or modification is difficult to assess ".

It has not been possible to determine the actual principle of the action of penicillin on the treponemes. It would seem that the antibiotic exerts a lethal effect on them without bringing about lysis. It is true that in man a considerable fall in the number of treponemes is observed following penicillin treatment. Nevertheless, in animals treated with cortisone the treponemes are immobilized by penicillin, perhaps even killed, but not lysed. It may be supposed that under normal

[2] See *Bull. Wld Hlth Org.*, 1956, 14, 235, 263.

conditions the treponemes are phagocytized and that this process is inhibited, at least partially, by the accumulation of mucoid substances in animals treated with cortisone.

Future research

Although it is true that the results given in the monograph have elucidated many problems in the field of the experimental treponematoses, nevertheless there are various subjects calling for more thorough study and new lines of investigation awaiting exploration. In this connexion the authors suggest that research should be carried out on:

(*a*) the adaptive and mutational patterns of the pathogenic treponemes (during animal passages certain strains have shown a variability whose nature and characteristics call for investigation);

(*b*) the immunochemistry of pathogenic treponemes, with particular reference to the identification of serologically active antigenic components, both in the body of the treponeme and in the capsular material, with a view to finding improved methods for demonstrating group or species-specific antibody;

(*c*) the nature of Wassermann antibody (reagin), the mechanism of its production and its role in treponemal and other chronic disease processes;

(*d*) methods of cultivating treponemes in vitro.

LEPROSY IN THE AMERICAS

Modern public health workers in many parts of the world are no longer regularly in contact with leprosy and the disease tends to be regarded too often as a relic of the past. However, a recent analysis of the distribution and number of leprosy cases throughout the Americas has revealed the disturbing fact that, far from being reduced to a minimal level, this disease is still an important public health problem, despite the effectiveness of new treatment methods with the sulfones. A report entitled *The problem of leprosy in the Americas* was presented for discussion to the last meeting of the Directing Council of the Pan American Sanitary Organization, which acts as the WHO Regional Committee for the Americas, in September 1956 in Antigua, Guatemala.[1] It is evident from the report that although new developments in treatment of leprosy, and particularly therapeutic methods, have resulted in overcoming fear and bringing more patients to the physician, this could not be said to supply the complete answer for the problem of leprosy as indicated in the statistics compiled. Indeed, as the report observes, "In the Americas there are a number of foci of the disease, and although generally speaking the prevalence rates are not as high as in some parts of Africa or Asia, forceful measures are required to solve the problem in this Hemisphere." But—the report points out—"Before any systematic program for the control of leprosy can be planned in the Americas, at either the national or the international level, more precise knowledge must be gained of the extent and epidemiological characteristics of the problem. Many countries have yet to undertake leprosy censuses, and in others such censuses have been only partial or incomplete."

In the table appended will be found a summary of the information collated by PASB/WHO on the prevalence of leprosy in the Americas and the existing facilities for its treatment and control. These statistics are as up to date as possible but it should be borne in mind that certain countries

[1] For further details of this meeting see *Chron. Wld Hlth Org.* **10**, 382.

have developed and improved leprosy control services since the information was collected.

During the discussion of the report great interest was expressed in the change of attitude to leprosy which had taken place in public health services throughout the world. Stress was laid on the new concepts and practices being recommended by leprologists, especially the possibility of early active drug treatment and rehabilitation, and selective isolation so that patients can be returned in a non-infectious state to active life.

Modern antileprosy measures

That a demonstrable need exists for more active measures in combating leprosy there can be little doubt. Recent experience has

PREVALENCE OF LEPROSY AND EXISTING FACILITIES FOR ITS TREATMENT AND CONTROL IN THE AMERICAS *

Countries	Estimated population for mid-year 1953	Leprosy cases			Leprosaria and colonies		Dispensaries	Date of information
		total known	segregated	total estimated	number	capacity		
Argentina	18 379 000	8 975	..	16 000	5 [f]	2 785	4	1954
Bolivia	3 127 603 [a]	610	35	1 400	2	..	3	1954
Brazil	55 211 268	60 967	22 954	..	38 [g]	24 000	93	1950
Canada	14 756 000 [b]	16	10	17	..	..	..	1952
Chile	6 024 981	37 [e]	13	37	1	40	..	1954
Colombia	12 107 810	9 155	6 507	12 000	2 [h]	..	11	1950 and 1956
Costa Rica	881 313	211	164	..	1	200	1	1950
Cuba	5 394 396 [c]	3 623	736	6 000	2	..	10	1952
Dominican Republic	2 290 805	268	188	..	..	..	..	1950
Ecuador	3 439 000 [d]	150	..	..	2	..	1	1955
El Salvador	1 929 779	62	..	..	..	..	..	1953
Honduras	1 555 664	40	5	..	— [i]	—	—	1955
Mexico	28 052 513	11 378	..	50 000	1 [j]	..	19	1953
Paraguay	1 504 246	979	394	10 000	1 [k]	..	1	1954
Peru	8 591 300	1 127	..	3 400	3	550	7	1951
United States	158 306 000	..	400	1-2 000	6	..	..	1955
Uruguay	2 523 000 [d]	..	62	500-1 000	— [l]	..	..	1954
Venezuela	5 377 508	8 648	866	..	..	..	171	1956

* No data obtained for Guatemala, Haiti, Jamaica, Nicaragua, and Panama.
— None.
.. No information.
[a] Revised report.
[b] Excluding the Yukon and the Northwest Territories. Population as of 1 June.
[c] Estimated population for mid-1952.
[d] Estimated by PASB.
[e] There are no leprosy cases in continental Chile. These are found on Easter Island (population 800).
[f] Plus 5 transit hospitals and 1 preventorium.
[g] Plus 29 preventoria.
[h] These are in fact "lazarets", having a mixed population of patients and healthy persons.
[i] The Tegucigalpa Hospital has 8 beds for leprosy patients.
[j] Plus 4 special wards in general hospitals with 105 beds. There are also 3 preventoria.
[k] Plus 1 preventorium for healthy children of leprosy patients.
[l] Patients are interned in a general hospital.

indicated that leprosy demands a higher priority under national public health programmes in countries on the American continent, if it is to be successfully brought under control. Many interesting facts regarding recent national antileprosy work were brought before members of the PASO in the course of the Antigua meeting. The representative of France drew attention to the fact that since the systematic search for leprosy cases was begun in French Guiana, Martinique, and Guadeloupe the known number jumped from approximately 250 to nearly 2000 in the course of six years. This did not imply a leprosy epidemic but rather that a greater number of cases—many of them in the younger age-groups—had become known where treatment could be more effective. In the leprosarium at Fort-de-France nearly 50% of the patients were under 20 years old and more than 25% under 14. Outlining the modern antileprosy measures carried out in the French Antilles, the representative of France said that sanatoria had been established for treatment of leprosy cases during the infectious stage. While the patients were in the sanatoria they were taught how to treat themselves after departure. Another phase was dispensary treatment for those who did not require hospital treatment, or for those who had left hospital and were able to live with their families.

In Brazil leprosy constitutes a very important problem and, as was pointed out by the representative of Brazil, the techniques used to date for leprosy control had not produced the results expected. This, despite the fact that there were 36 leprosaria, 31 preventoria, and 80 regional dispensaries in operation. The Brazilian National Leprosy Service was revising its operating methods in keeping with new developments.

Use of BCG in leprosy control

Possibilities inherent in the use of BCG vaccination for leprosy control were touched on by the delegate of Venezuela. It will be recalled in this connexion that the Expert Committee on Leprosy in its first report [2] was unable to endorse fully the use of BCG vaccination and confined itself to the following comment: "Though there is indirect evidence of the protective value of BCG against leprosy, the Committee could not justifiably recommend it officially as a control measure until adequate large-scale trials had been conducted." However, as the representative of Venezuela remarked, BCG vaccination had been applied in leprosy areas of Venezuela for many years. There were two distinct types of programme: (*a*) vaccination of the entire population in leprosy areas, and (*b*) vaccination of the population under 15 in leprosy foci for four consecutive years. Under these two different types of programme between 200 000 and 250 000 people were being vaccinated annually in Venezuela. This experiment would be of use in arriving at a conclusion on the usefulness of BCG as an antileprosy agent.

Importance of new approach

In drawing attention to the fact that treatment of leprosy cases in dispensaries in the British West Indies has now become increasingly common the representative of the United Kingdom pointed out that the old inflexible laws on leprosy were in the process of being changed and a new approach was being adopted towards the disease, from both medical and social viewpoints. One of the important steps in changing public attitude towards leprosy was the revision of legislation which maintained the outdated concept of the disease.

The representative of Colombia underlined the fact that the leprosy problem in the Americas was much more important than had been believed formerly. This fact was evident in the large number of cases revealed by recent statistics and the large sums of money being spent in antileprosy campaigns. In Colombia 20% of the public health budget was used for the care of 12 000-15 000 leprosy patients, 6000 of whom were in leprosaria.

In conclusion, the Directing Council of the

[2] *Wld Hlth Org. techn. Rep. Ser.* 71

Pan American Sanitary Organization noted the increasing importance of leprosy in the Americas and recommended that national programmes against the disease should be revised in the light of modern knowledge. The Director of PASB was requested to continue studies of the extent of the problem, to facilitate the training of personnel for national leprosy services, and to promote technical discussions.

CENTRES FOR STUDIES ON ENTERIC BACTERIA

The identification and classification of the micro-organisms causing enteric fevers has for half a century been a subject of controversy among bacteriologists. Few groups of bacteria have given rise to so much research work as the salmonellae, the escherichiae, and the shigellae, the causative agents, respectively, of typhoid and paratyphoid fevers, severe forms of infantile diarrhoea, and bacillary dysentery.

The wide range of their antigenic and enzymatic properties has necessitated the use of serological and biochemical methods of classification which during the last fifty years have been constantly improved and refined. In addition, identification techniques have been developed, based on interactions with specific bacteriophage strains.

The efforts made to find a satisfactory basis for the classification of these micro-organisms have not had a purely scientific aim, or been merely of academic value. These pathogens are found all over the world and they still give rise to public health problems in many countries, despite improved standards of hygiene and sanitation which impede their propagation.

Thus in Japan, nearly 83 000 cases (with nearly 5000 deaths) of bacillary dysentery were notified in 1956 (51 weeks), and more than 2000 cases of typhoid fever; in Iran, in 1955, there were more than 5000 cases of typhoid and paratyphoid; in Iraq, in the same year, there were more than 1400 cases of typhoid and more than 1300 cases of bacillary dysentery. In Turkey, during the first 11 months of 1956, the number of notified cases exceeded 5000; and in Italy, in 1955, more than 19 000 cases of typhoid and nearly 5000 of paratyphoid were reported. In Greece, during the same year, there were some 4600 cases of typhoid and paratyphoid; in Portugal, some 3000 cases; in France, about 4500; and in Yugoslavia, about 4000.

Typhoid fever has a tendency to regress in countries where hygiene standards have improved and the population has clean water at its disposal. Nevertheless, in predominately rural areas, both in temperate climes and in the tropics, typhoid fever prevalence remains high, and, judging from available mortality data, it is more serious as a public health problem than the paratyphoid fevers, notwithstanding the numerically greater importance of the latter in many countries.[1]

International centres for studies on enteric bacteria

Because of WHO's concern with the distribution and incidence of these diseases the Organization agreed, at the suggestion of the International Association of Microbiological Societies (IAMS), to sponsor and develop on a world-wide scale the activities of three centres specializing in the identification and classification of enteric bacteria.

In 1948 WHO assumed a supervisory responsibility for the International Salmonella Centre which had been in operation at the Statensserum Institut, Copenhagen, since 1938. In 1950 the Centre was extended to cover the study of another group of

[1] *Chron. Wld Hlth Org.* 1955, 9, 287

bacteria, namely the escherichiae. The two other centres, concerned especially with the study of the shigellae, one of which is in London, England, and the other in Atlanta, Ga., USA, were established as international centres, with the support of WHO, in 1954.

The basic aim of these international centres is to promote uniform classification and terminology throughout the world for the salmonellae, escherichiae, and shigellae. It is not their task to lay down rules of nomenclature, which is the responsibility of special committees of the IAMS, but to collect, identify, maintain, and distribute cultures of these bacteria and to prepare and distribute diagnostic antisera, by means of which the antigenic type of the bacteria under study can be determined. This work of identification and classification establishes foundations for the epidemiological study of the diseases caused by these micro-organisms. It is not the immediate task of the international centres to study epidemics themselves. They supply reliable and uniform bacteriological data and materials which will be of help to the public health specialists of the various countries in the laboratory work necessary to operate effective control methods.

Collaboration with the national centres

The work of the international centres calls for close liaison with other laboratories throughout the world, in particular those which act as the main enteric diagnostic laboratories within their own countries, i.e., the national centres. An example will help to clarify the relationships established between the international and the national centres. If an outbreak of dysentery or food poisoning occurs, the micro-organism responsible will be isolated at the national centre for the study of enteric bacteria and will be identified with a degree of accuracy varying according to the particular case. This work will be facilitated by one of the international centres, which will send the national centre reference sera or specific bacterial strains, as well as technical advice. In difficult cases, the international centre may be called upon to assist in the exact classification of the micro-organism. On the other hand, the national centre should investigate the epidemiological aspects of the outbreak, its gravity, extent, causes, etc. In the field of bacteriological identification, moreover, the responsibility of the national centre is an important one, as if the national centres themselves did not do most of this work, but merely referred much of it to the international centres, the load thrown on the latter would be far too great.

WHO suggests designation of national centres

However, a more extensive network of co-operating national centres in the study of the enteric bacteria and the epidemics they cause is now needed. Consequently, WHO recently sent a letter to Member States describing the services which the international centres can render to the national health administrations and the relationships it is desirable to develop between them. The letter also contained suggestions to governments wishing to improve, designate or set up national centres for the study of the salmonellae, escherichiae and shigellae. Clearly, the activities of these centres represent only one aspect of the campaign which the health authorities must carry on against the diseases caused by these micro-organisms. These efforts include adequate sanitation measures and an improvement in general living conditions.

Training of qualified personnel

Relations between international and national centres can only be fruitful when the latter have a staff of experienced bacteriologists, specialized in this type of investigation. This is an essential condition for the creation of a national laboratory. If the staff at the national level is not sufficiently qualified then there is a risk that the international centre will be swamped with requests for work which would normally come within

the scope of the national centres. However, microbiologists specialized in this field are available in sufficient numbers in some countries only, and suggestions have therefore been made for visits by experts from experienced laboratories to give advice where required, and for specialized training of microbiologists in international centres.

As pointed out in the letter, in each of the international centres bacteriologists have the possibility of familiarizing themselves with biochemical and serological techniques for the identification of the enteric bacteria. At Atlanta, a 10-12 days' course dealing with the laboratory diagnosis of the enteric group of infections is given annually for about 20 participants, and a more advanced course is organized for a minimum of two weeks for a smaller number of bacteriologists. At Copenhagen and London, individual training is given, arrangements being made for each particular case. The WHO fellowships programme also makes a useful contribution towards the wider exploitation of these facilities for professional training.

In these ways WHO is endeavouring to establish the basis for a more effective control of enteric diseases by developing and active network of laboratories of high scientific standard.

PUBLIC HEALTH PROGRESS IN AFGHANISTAN *

Despite the innumerable difficulties which its geographical situation gives rise to, Afghanistan is making a courageous effort in public health. Only a few decades ago, no beginning had yet been made. Epidemics of typhus, cholera and smallpox ravaged the country; malaria, tuberculosis and nutritional deficiencies took a heavy toll in deaths; the death rate among young, badly-fed infants was enormous; there were no doctors, nurses or sanitary technicians. The Government realized that the first necessity was to provide the country with suitable health facilities. Foreign physicians were called in; and the King, Nadir Shah, founded the Faculty of Medicine, which was directed first of all by Turkish and then by French professors. Today, professors are recruited from a number of countries by agreements between governments or sent by WHO. Several Afghan lecturers now also hold Chairs. So far, the number of students enrolled each year does not exceed 130-150. Schools for male and female nurses are training medical auxiliaries.

Kabul has two large modern and well-arranged hospitals and a sanatorium; these establishments function as satisfactorily as the difficulties of obtaining equipment and drugs allow. Large hydro-electric plants are being built, and when they are completed the problems consequent upon an uncertain electric current will disappear.

Provincial hospitals have also been constructed but they are still short of staff and equipment. A very modern hospital for women was recently opened at Kandahar with WHO assistance; it provides out-patient, maternal and child health, prenatal and milk distribution services. Provision has also been made for setting up mobile units for emergency treatment among the nomadic tribes in regions where lack of communications makes access difficult.

In addition to the Faculty of Medicine, Kabul also has a number of specialized institutions which were created under the aegis of WHO. A public health laboratory carries out routine biological examinations and trains laboratory technicians. A malaria institute and a tuberculosis institute supplement the efforts of the technical advisers and public health specialists and, at the same

* Summary of an article by Médecin-Colonel G. Bernier, formerly Professor of the Faculty of Medicine of Kabul, which appeared in the *Revue d'hygiène et de médecine sociale*, 1956, 4, 687.

time, train Afghans for key posts. In short, a well-planned organization has been established and is gradually growing. As will be seen, it already has some notable achievements to its credit.

Malaria control

Up to 1950, malaria was rife in the whole of the Kunduz region between the Hindu Kush and the Amu Darya. Each year the thaw caused vast floods and created innumerable anopheline breeding-places, with the result that at least 25% of the inhabitants were affected by malaria and typhoid fever and so were prevented from harvesting the crops in this fertile region normally. Economically, this represented an annual loss of $20 000 000. The sanitation work which was later carried out cost the State about $15 000 but the results were spectacular. The Kunduz region is now one of the richest agricultural areas in the country.

However, Afghanistan could not, on its own, extend this operation to the whole of the country and it was therefore with the aid of WHO that a large-scale mosquito control campaign was launched in the region of Kabul, which was particularly hard hit by malaria. The most up-to-date methods were employed and, except in a few outlying spots where sanitation measures still have not reached, malaria has now practically disappeared from the region. The campaign is being gradually extended to the rest of the country, and there is reason to hope that in a few years the disease will have been eliminated.

Louse-borne typhus

Not very long ago, louse-borne typhus was a country-wide pestilence. Hard winters, overcrowding in barely heated mud houses, under-nourishment and poverty caused frequent and devastating epidemics. The epidemic at Kandahar in the winter of 1951, for example, caused 1000 deaths in a month. However, since the introduction of systematic DDT dusting in the army, the police force, and in schools, mosques and public vehicles, of disinsectization of dwellings by special teams, and of anti-rickettsiosis vaccination there have been no epidemics. The few isolated cases notified have been treated by the Kabul or provincial hospitals.

Smallpox, cholera, tetanus and rabies

Vaccination against smallpox, cholera and tetanus is becoming increasingly common, at least in Kabul and the larger towns—for it is still difficult to reach the nomadic tribes. A marked regression of smallpox has been noted.

The Kabul Institute of Hygiene now produces enough smallpox vaccine to meet the country's needs, and also gives anti-rabies treatment to persons bitten by stray dogs or by the wolves which in the very cold Afghan winter penetrate as far as the capital.

Tuberculosis

Tuberculosis is another serious problem in the country. Nevertheless, an auspicious start has been made towards its solution by tuberculin-testing in Kabul schools, by systematic case-finding by the Tuberculosis Institute (set up with assistance from WHO), and by a BCG vaccination campaign. Unfortunately, however, the Kabul sanatorium is at present too small to accommodate and treat all the confirmed cases of tuberculosis in the country. The problem is certainly serious, but the results obtained so far augur well for the future.

Infant health

According to WHO statistics, about 50% of Afghan children died in 1950 before reaching the age of two. This situation is due to a general ignorance of the elementary principles of child welfare and to the extremely low wages which do not enable the head of the family to feed, clothe and maintain his children adequately. Consequently, the children frequently suffer from severe deficiency, especially during the long, icy winters, with the result that they die in large numbers or show very serious growth

retardation. However, the situation is better in the provinces, where the children of the agricultural workers and nomads are able to get enough milk products, meat and flour.

The serious problem of the children's health cannot be solved until the living standards of the poorer people in the towns have been raised. In the meantime, there are dispensaries for the distribution of milk and urgently needed drugs, a children's department with 35 beds in the Mastourat hospital in Kabul, maternity hospitals, modern hospitals like that of Kandahar, benevolent organizations, and the Red Crescent. All these help to redress the balance by educating the mothers and meeting some of the most urgent needs.

YAWS ERADICATION : A PROGRESS REPORT

Since 1949 great progress has been made in the practical technique of yaws control. With adequate resurveys after the mass treatment of the populations, followed by adequate surveillance, yaws could be eradicated within the next ten to twenty years. Among the developments which have played an important part in bringing about the present encouraging situation are, firstly, the use of inexpensive, long-acting penicillin preparations—especially procaine penicillin G in oil with 2% aluminium monostearate (PAM), 1 ml containing 0.3 mega units— which in single injections will give treponemicidal blood levels for several days; and, secondly, the recognition of the importance of the characteristic tendency of latent cases in a yaws community to relapse. Already throughout the world over 60 million people have been examined and over 15 million treated during yaws campaigns in which international organizations have assisted national health administrations. Following these campaigns the prevalence of active yaws has rapidly fallen to very low levels.

To be effective, yaws eradication must be aligned with the broad public health programme of a country, and this programme must in turn be related to social and economic development and to improvements in the standard of living. WHO has played an important role in the progress towards successful anti-yaws campaigns through advisory services, provision of consultants, awards of fellowships, and, finally, by the organization of regional and other international conferences on the subject. For example, between 1949 and 1952 the Expert Committee on Venereal Infections and Treponematoses met four times. In 1952, the First International Symposium on Yaws Control took place in Bangkok,[1] and in 1955 an International Conference on Yaws Control was held in Enugu, Nigeria.[2]

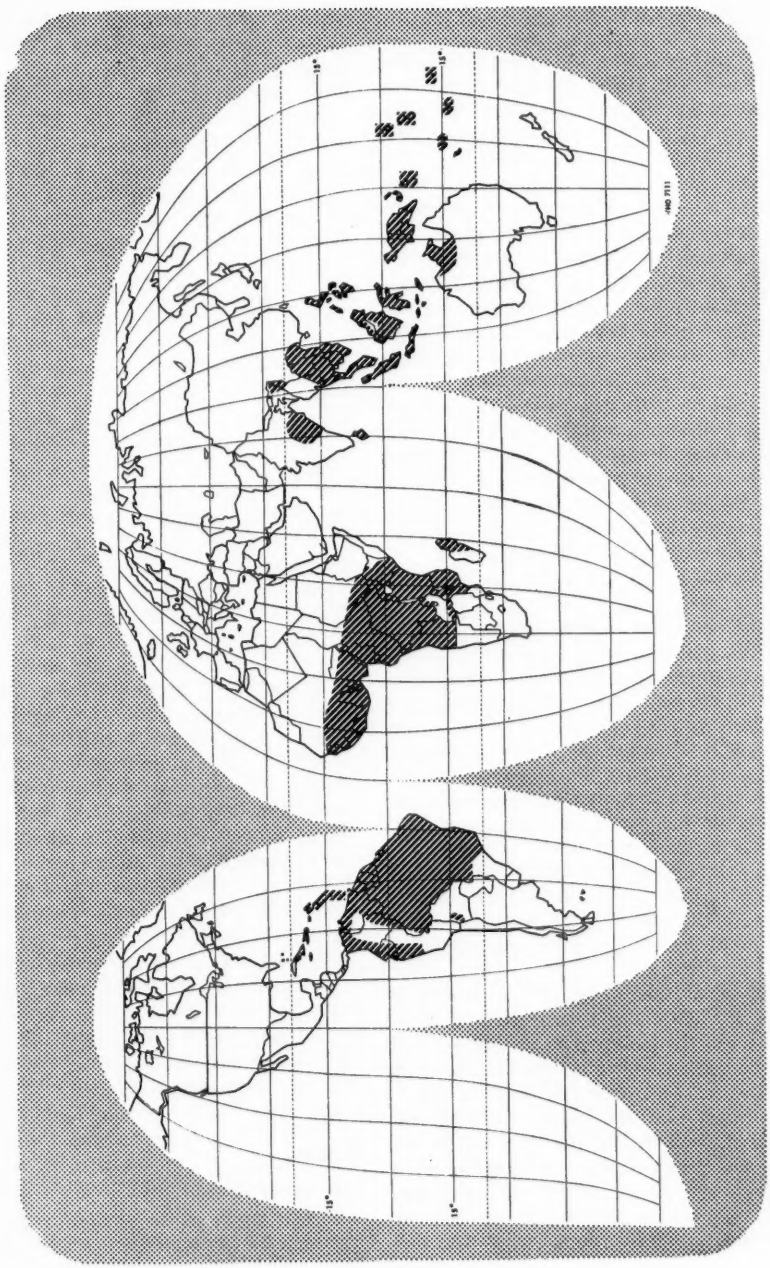
A more indirect but no less important way in which WHO has contributed to the eradication of yaws has been by making available new knowledge resulting from internationally co-ordinated research, particularly that conducted at the International Treponematosis Laboratory Center at Johns Hopkins University, Baltimore, Md., and the WHO Serological Reference Laboratories at Copenhagen and Chamblee, Ga. An account of the work carried out at the International Treponematosis Laboratory Center appears elsewhere in this issue.

Extensive national campaigns against yaws have been made possible in many countries through the co-operation of UNICEF, which has made available penicillin, syringes, needles, and transport and other equipment. WHO has assisted such campaigns with technical advice and staff.

[1] World Health Organization (1953) *First International Symposium on Yaws Control*, Geneva (*World Health Organization : Monograph Series* No. 15)

[2] *J. trop. Med. Hyg.*, 1957, **60**, 27

DISTRIBUTION OF YAWS



Organization of anti-yaws measures

The minimum dose of long-acting penicillin (PAM) for adults with active yaws is 1.2 mega units (4 ml), with proportionately smaller doses for children. If the prevalence of active yaws is high, all active cases are treated and the rest of the population is considered as latent cases or contacts and given half doses; this is total mass treatment. If, because of local conditions, it is not practicable to treat the latent cases and contacts, then the reduction of the prevalence of yaws to a level at which it is not at the time a public health problem will take longer. More resurveys will, however, be required than if total mass treatment had been carried out. Effective yaws control can nevertheless be achieved by repeated resurveys. Whatever treatment policy is carried out resurveys will be needed to find out the prevalence of yaws following the mass treatment and to treat any active cases that may have developed or moved into the area and the close contacts of infectious cases.

It has also become apparent that the aim should be to see all the population at the initial treatment surveys and at the resurveys. For this and all other aspects of yaws eradication and, in fact, for any public health activity, it is essential to win the intelligent co-operation of the people. However difficult the task may be it cannot be neglected with impunity. If the people do not understand what is being done and why it is being done the risks of misunderstanding and distrust are always present and co-operation will lack the vital quality which is present only when people really feel the need for the assistance offered.

Even when the prevalence of yaws has been reduced to a low level there is a paramount need for continued surveillance so that any infectious cases may be immediately recognized and treated. Only thus will transmission cease and eradication be achieved. The activities needed in the later stages are perhaps less dramatic than those of the mass treatment stage but they are just as important. The national health administrations and the civil rural administrations who will be required to assist in the financing of the campaign must be made aware of the requirements of these later stages while the project is being planned.

To avoid spending large sums of money in finding the last few cases in the final stages of an eradication campaign the resurveys should be done simply and economically by trained searchers or, if possible, linked to some other public health activity of a similar nature.

The surveillance of the population can best be based upon rural health centres, which, if not already in existence, should be planned and provided for at the outset of the campaign. This will require finance and adequate trained staff, both of which are difficult to get. Obtaining qualified personnel is often particularly difficult and may necessitate the expansion of training facilities. Auxiliary staff trained for yaws campaigns should be given further training later and absorbed into other health activities.

Close supervision of staff is necessary at all stages of the campaign so as to maintain adequate work standards and avoid demoralization. The arduous nature of the field work and the qualities of those engaged in mass campaigns should be recognized by ensuring that they are at no disavantage compared with those in more routine and sedentary posts. Adequate simple returns of the work done and of the prevalence of yaws at each survey should be maintained so that the progress of the campaign can be assessed. To increase the usefulness of such data sample serological surveys should be combined with the clinical surveys.

Although the technical knowledge required to carry out a successful yaws eradication campaign is readily available, the organizing and administrative skill to put it into successful effect demands the close attention, interest, patience and drive of all those responsible.

Results

The Americas

In the Americas the outstanding campaign has been that in Haiti, which started in 1950.

By 1955 the rural population of over 3 000 000 people had been treated either as cases or as contacts. Cases comprised people with signs, symptoms or history suggestive of yaws. The contacts made up the rest of the population. The dosage used was 0.6 mega units of PAM for cases and 0.3 mega units for contacts, regardless of age. Subsequent sample resurveys showed that the prevalence of active yaws had been reduced from a high figure to less than 1%. The improvement in the general activity of the population has been recognized with satisfaction by the Haitian Government. Present activities in the campaign are bringing the yaws situation to an eradication level.

Other yaws eradication projects jointly assisted by WHO and UNICEF include certain of the Caribbean Islands where yaws has long been known and much effort has been made against it. A yaws eradication campaign is planned in Brazil; national yaws campaigns have been carried out in Colombia, Venezuela, and Ecuador. A seminar on endemic treponematosis eradication was held in 1956 in Port-au-Prince by the Pan American Sanitary Bureau (acting as the WHO Regional Office for the Americas) with the co-operation of the Government of Haiti and was attended by 48 public health administrators and treponematosis specialists from the different countries affected in the Region. At this seminar the practicability of yaws eradication was again stressed as was the need for initiating yaws eradication campaigns in places where the disease was still endemic, the efforts being co-ordinated so as to prevent reintroduction of yaws to areas already freed of the disease.

Africa

The first WHO/UNICEF-assisted yaws project in Africa started in Liberia in 1953. It is based at Kpain in the hinterland near the French Guinea border. Total mass treatment has been carried out with great success. The campaign is being rapidly extended to cover the whole Republic. Already over 400 000 persons have been examined and treated at initial treatment surveys and over 250 000 persons have been examined at resurveys. Yaws campaigns are in action in Nigeria in each of the three regions, and in the British Cameroons. Here again total mass treatment has reduced the prevalence from 20%-30% to about 1% within a year. Over 3 million people have been examined and over 2 million treated. The campaign in Nsukka, in the Eastern Region of Nigeria, is remarkable for the development of rural health centres, financed by local African councils, in areas where the beneficial effects of the campaign have been experienced. Resurveys are made by yaws scouts whose work has been shown to be good. Other WHO/UNICEF yaws campaigns are in operation in French Togoland, Ghana (Gold Coast), and Sierra Leone. Campaigns are being planned in other parts of Africa.

At the International Conference on Yaws Control held in Enugu an Africa-wide campaign to eradicate yaws was envisaged. Following this a meeting of representatives of the health administrations of Sierra Leone, Liberia, French West Africa, Ghana, and French Togoland was called by WHO in Accra in August 1956 with the object of co-ordinating anti-yaws activities along the borders between the westerly territories of West Africa. There can be little doubt that the way is now open for the eradication of yaws from Africa.

South-East Asia

The first anti-yaws campaign in this region started in Indonesia in 1950. The Republic has a population of some 80 million persons with an estimated average prevalence of active yaws of about 12%. The problem is gigantic but the campaign, planned and administered by Dr R. Kodijat, is making good and rapid progress. It is now largely based upon the polyclinic in the smallest semi-autonomous unit—the sub-district—which has an average population of about 30 000 persons. These surveys are carried out by the " djuru-patek ", usually a suitably trained young villager, while the trained nurse of the polyclinic goes to the village at about four-day intervals and checks the diagnoses and

treats only the yaws cases. The yaws campaign is integrated into the rural health services from the start and resurveys are automatic. The fall in yaws prevalence is much the same as that following total mass treatment but it takes two to three times as long. The effect in smothering the reservoir of relapsing yaws is excellent. An admirable scheme for the surveillance of the consolidation phase has been drawn up in Indonesia. In areas of over 30% yaws prevalence, and in isolated or dispersed communities whatever the prevalence, total mass treatment will be carried out. Numbers involved in this latter operation alone are estimated to exceed 8 million. From the start of the campaign in 1950 up to the end of 1955 over 21 million persons had been examined once and nearly 14½ million more than once; a total of over 3½ million persons had received treatment.

An extensive campaign is also being carried out in Thailand, during which 12 million persons have been examined and over one million treated. An inter-State yaws campaign is also in progress in India where, although the prevalence is rather low, careful work has greatly reduced the number of active cases.

Western Pacific

The first campaign against yaws in this geographically dispersed region began in 1951 in the Philippines, where it is now being carried out mainly from the recently developed rural health units. Good progress is being made and the prevalence of yaws has been greatly reduced. Laos also initiated a campaign and one was started later in Malaya. In both areas the prevalence found was not high.

Campaigns in the island territories of Fiji, Western Samoa and the British Solomon Islands Protectorate were started in 1954 and have been very successfully carried out with notable co-operation between the Government, WHO, and the local inhabitants. In these islands most of the travelling has been of necessity by ship. A successful campaign was started in West New Guinea in 1955 and much arduous mountain travelling has been undertaken. Campaigns in other island groups are being planned.

* * *

It will thus be seen that throughout the world activities against yaws are widely spread and still expanding. They are also being co-ordinated regionally and subcontinentally.

In addition to exerting a beneficial effect on yaws patients through present and future campaigns, a more general improvement in personal hygiene, environmental sanitation and standards of living should be encouraged since, in combination, they will remove the conditions that make for the transmission of yaws and thus render complete eradication possible. There is already much evidence to show that the immediate and visible results of yaws campaigns are powerful factors favouring the development of more healthy living.

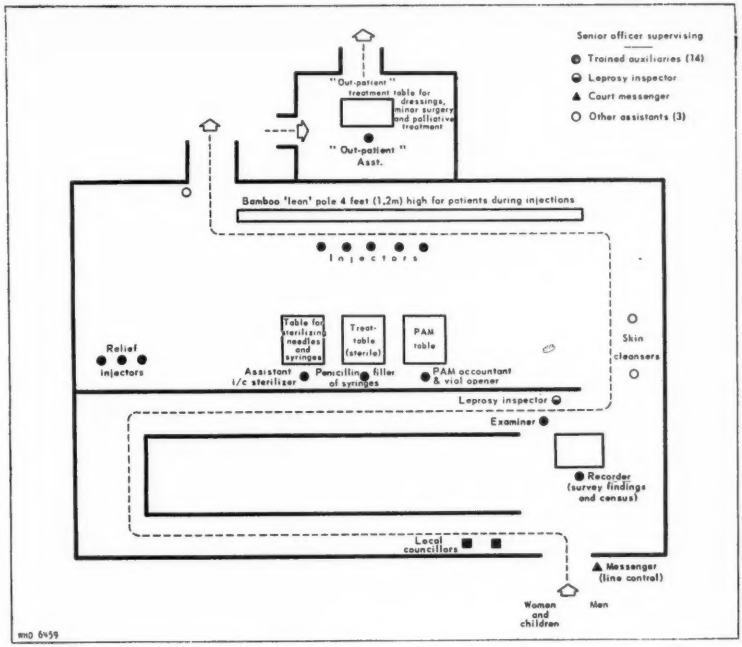
Quarantine and vaccination requirements

A recent supplement to the WHO *Weekly Epidemiological Record* (No. 7, Suppl. 1) provides details of the situation, on 15 February 1957, with regard to quarantine measures and vaccination certificate requirements. Information is given for some 170 States and territories throughout the world. The first part of the supplement shows, in tabular form, the position of States and territories under the International Sanitary Regulations. The second part consists of a detailed list of quarantine measures and vaccination requirements. The supplement concludes with the text of the reservations to the International Sanitary Regulations at present in force.

The list of vaccination requirements for the majority of States and territories of the world is of direct concern not only to the public health worker, but also to transport and communications officials.

THE ORGANIZATION OF A YAWS ERADICATION CAMPAIGN

An illustrated feature based on experience in WHO-assisted campaigns in Africa



Campaigns for the eradication of yaws are now in progress in various parts of the world. Their efficacy can be greatly improved by attention to minor details of organization which may well be overlooked when the broad plan is drawn up. The accompanying diagram, originally devised by Dr A. Zahra to show the method he employed in Eastern Nigeria, may form a valuable basis for planning the layout and teamwork of similar projects elsewhere.

This particular scheme allowed one supervisor with 12 or 14 trained auxiliaries to handle some 1000-1500 people a day in a continuous working-period of 5-6 hours. If the work is to go through smoothly and without delay there must be a regular passage of people past the team. It is essential that those waiting to come in should be in orderly rows. When the examination area is entered (1) the line is maintained by a light hand-rail. The messenger helps in all this and explains what co-operation is needed when each person comes for examination. The supervisor—who happened to be a European in the team at work here—moves about the whole area, carefully but unobtrusively observing and assisting where necessary, and at the same time encouraging the interest of the team members in their work.

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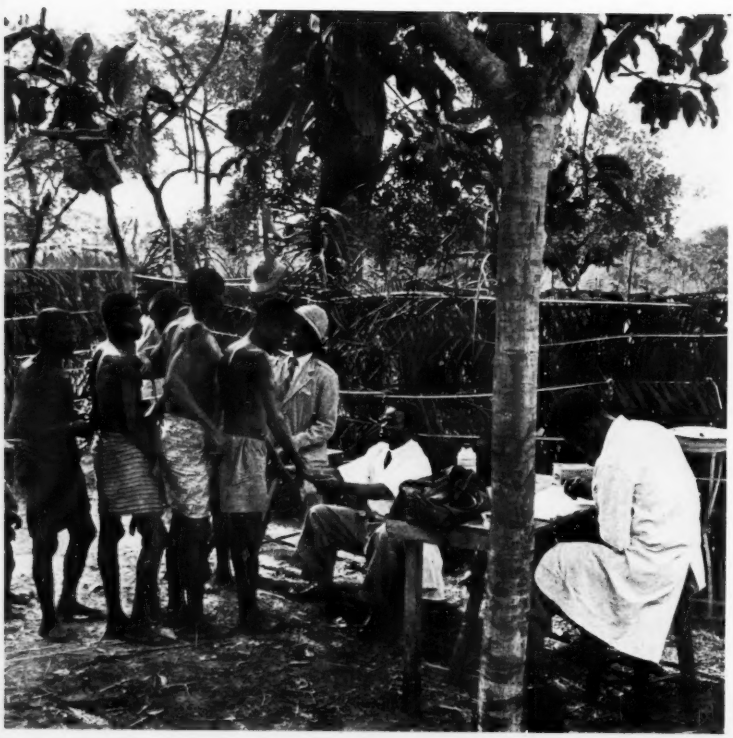


Each person comes before the examiner (2) who is seated on a low chair to facilitate his work. A brief, but thorough, inspection is made of the limbs and exposed parts of the body; the last varies, of course, with the age of the person, for no offence must be given. The examiner calls out his diagnosis (simplified to a few important and easily recognized groups), the age of the person, and the dose of the procaine penicillin in aluminium monostearate (PAM) to be given. The dose is written in damp, white chalk on the upper part of the back of each individual where it can be easily seen later by the injector. This is done by an assistant who may be either a literate villager or, preferably, a member of the leprosy survey staff (3) who, in addition, looks for evidence of leprosy. In Eastern Nigeria, during the survey and treatment for yaws of a population of 383 700, these trained leprosy inspectors found 1760 new cases of leprosy, of which 10% were lepromatous. The post between the two team-members (2) is for adults to support themselves while they raise each foot in turn for inspection of the sole.

The recorder (3, on the right) has before him a simple ruled chart on which he enters the examiner's findings by marks in the relevant spaces under various headings. From this chart are drawn data of the work done and the prevalence of yaws found.

Each person then passes through the gap in the central partition of the enclosure, where the upper and outer part of the right buttock is scrubbed with soap and water and a nail-brush and prepared for injection. He then enters the area where the penicillin is given (4). (Once the work is in full operation the numbers of people passing through obstruct a clear view of what is taking place.) On the right is the injection hand-rail, and on the left the auxiliaries are preparing syringes for use. They "scrub up" in the basin seen near by, and are provided with clean caps and gowns each day. The first man from the right, seated at the table (5), keeps a count of the number of 10-ml vials of PAM used; after shaking each vial and cleaning the top he removes the cap. The next man pours the contents into the barrel of a 10-ml syringe to which a needle is already attached, and then replaces the plunger. The loaded syringes are placed before him on a sterile towel ready for use. When the syringes are filled by pouring, 11 ml or more may be obtained from each 10-ml vial. Empty vials are also drained into one another to reduce waste of PAM as much as possible. The auxiliaries giving the injections return to the table after each injection and replace the needle by a sterile one. The syringes are sterilized before and after the day's work and also if they become contaminated at any time. The third auxiliary at the table takes the used needles, cleans them inside and out, and boils them for 20 minutes in the sterilizer on his right. About ten 10-ml syringes and 100 needles are in use for each thousand persons treated.

The people stand along the hand-rail or "lean"-pole facing away from the injectors (4); the dose of PAM he is to be given is clearly visible on the back of each person. Babies and small children are held in the arms of one of the auxiliaries to facilitate the injection, which is always given into the right buttock to assist in the recognition of those who may try to get another the next day.

After his injection the recipient leaves by a gap in the back wall of the enclosure. Near this exit is the "Out-patients' Department" where any dressing or other treatment ordered by the examiner or supervisor is carried out. Thus the more obvious complaints are not neglected, and very sick people, if they are willing, may be taken into the hospital at the end of the day's work. In this way the people realize that the team is more broadly interested in their well-being than in the treatment of yaws.

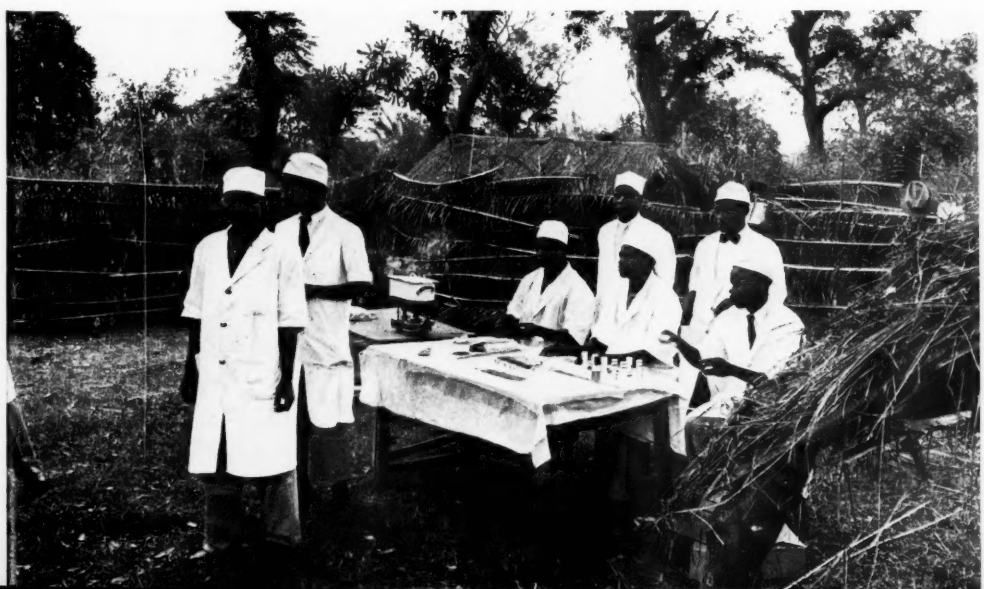
4

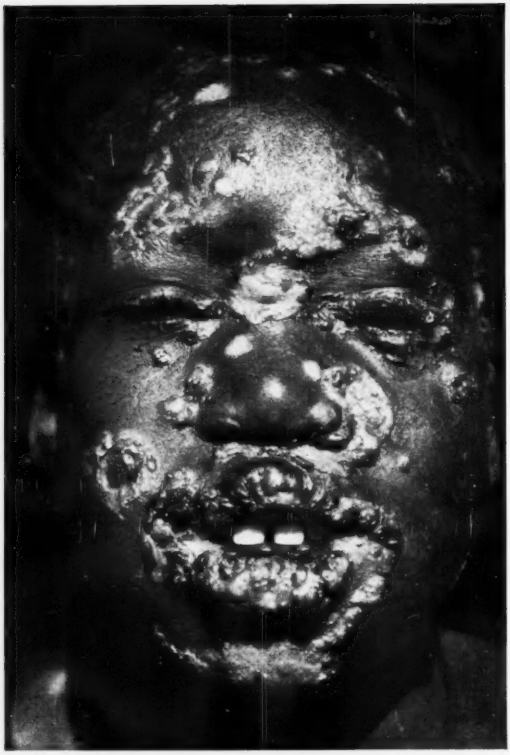
alone. No effort must be spared to develop the mutual respect of both groups, and thus to earn the continued co-operation of the people.

An important factor in gaining their confidence and in particular that of their leaders is that from the very beginning they should know what the campaign has to offer them and what help they will be required to give. After each day's work the medical officer or superintendent meets the village chief and his council, who are largely responsible for actively ensuring that everyone presents himself for examination. In Eastern Nigeria, for example, the average coverage has been over 95%, based upon census estimates and field inquiries. To carry out the resurveys, local youths who can read and write are simply but adequately trained for one or two months to make house-to-house surveys and to recognize active yaws lesions. All patients with active yaws, their immediate contacts, and persons who have missed the previous treatment survey are asked to come to some suitable place on a nearby road on a definite day and time when a supervisor or medical officer meets them, checks diagnoses and gives treatment. One " yaws scout " can screen about 200 persons per day, and resurveys can be made roughly every six months.

The councillors help the scouts in their work, and thorough control resurveys after the scout has been through a village have shown that, with periodic unexpected visits from the supervisor or medical officer, the method is effective.

Groups of patients and their contacts called together by yaws scouts were brought to a local health centre for the more ready observation by participants in the Second International Conference on Yaws Control held at Enugu in November 1955. The construction, maintenance and staffing of these health centres are financed by funds voted by the local council, and much free labour was given by the villagers as a further community contribution.





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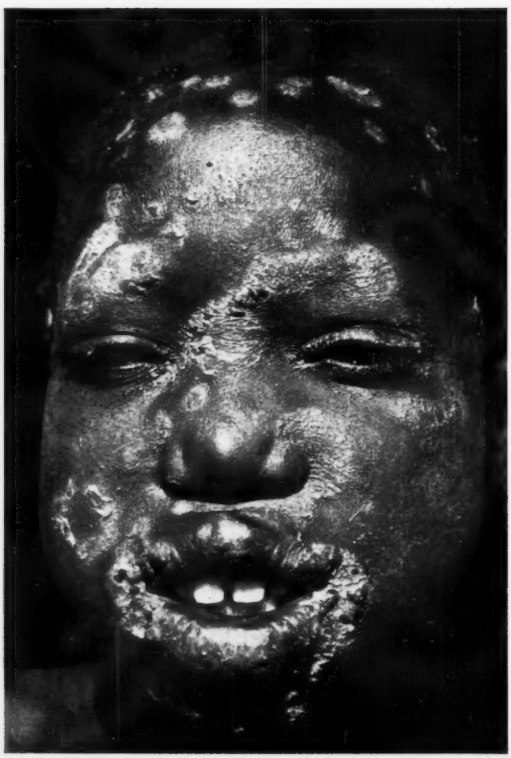
The immediate effect of this campaign on the average prevalence of yaws in the area was a reduction of all cases of yaws from about 15% to about 1%, and of infectious cases from an average of 5% to 0.1% at six months (first resurvey) and 0.05% at 12 months (second resurvey). Such satisfactory results, while greatly to the credit of the team and the village people, also reflect the careful planning behind the operation.

Yaws is a communicable disease of childhood. In communities where it is highly endemic, few adults are seen with early lesions, because most of them will have had the disease in youth. The characteristic lesion is the papilloma (6), an inflammation accompanied by marked hyperplasia of the epithelium and oedema. These lesions start as papules, and later may develop into various types such as the annular form on the right cheek of this child.

The effect of penicillin, and particularly of a single injection of PAM, on active lesions is dramatic. Within a week (7) remarkable improvement takes place. Infectious lesions cease to be so a day or two after the injection, and transmission is thus arrested. Two or three weeks later there is little or no evidence of the manifestations (8); since the papillomata are not ulcerative, scarring is slight or absent.

An important result of PAM treatment is that for two years or more after a dose of 1.2 megaunits (4 ml)—that is, of the magnitude suitable for adults—relapses are rare; thus treatment is as valuable to the community as to the individual sufferer.

There are several other skin lesions which are mainly modifications of the papillomatous response, some of which may resemble those seen during healing (7). Other early lesions may involve the bones (accompanied by considerable pain), and the palms and soles. The late lesions may affect the same tissues, but are, on the whole, more destructive.



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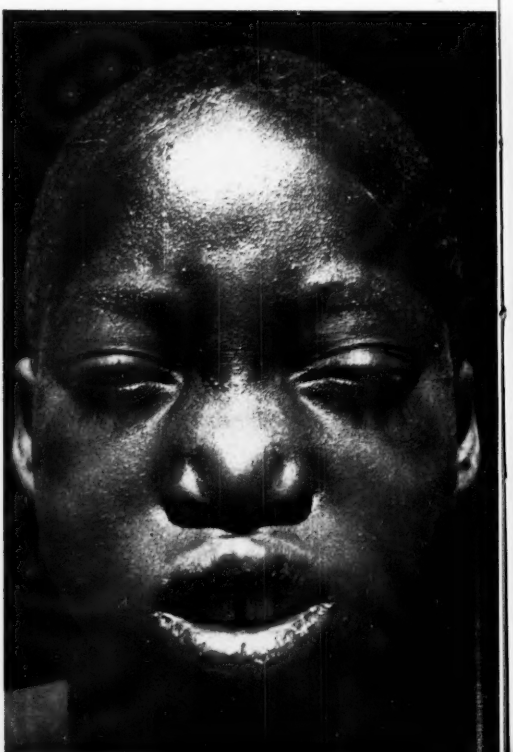


Epidemiological and Statistical Information

DEATHS FROM TUBERCULOSIS IN EUROPE SINCE 1950

Study of the latest statistical data published by WHO [1] shows that mortality from tuberculosis decreased everywhere between 1950 and 1955, and that in some European countries this drop was very marked indeed. The tuberculosis mortality curve for the last fifty years indicated first of all a slow and gradual decline, then a recrudescence in certain countries during the two world wars, and finally a sharp fall which has become even more pronounced during the past few years.

Although tuberculosis still causes many deaths in early childhood—and especially among infants under 1 year old—it is now a relatively infrequent cause of death between the ages of 5 and 15 years; the morta-

[1] See *Epidem. vital Statist. Rep.*, 1957, Vol. 10, No. 2. This number also includes the latest statistics on cases of and deaths from acute infectious encephalitis and typhoid and paratyphoid fevers.

FIG. 1. DEATHS FROM TUBERCULOSIS, ALL FORMS, AS PERCENTAGE OF GENERAL MORTALITY IN EUROPE, 1950 AND 1954

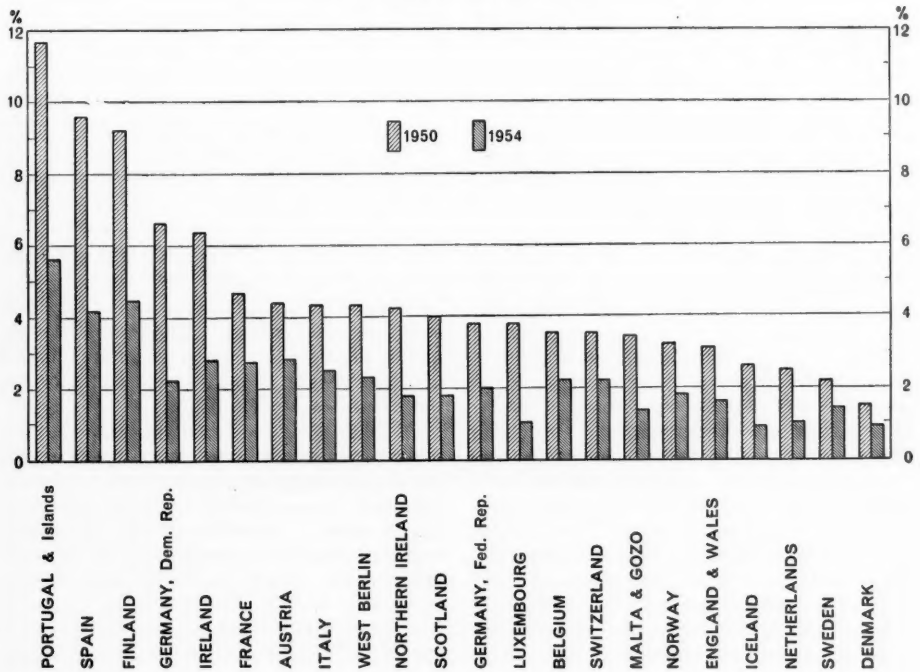
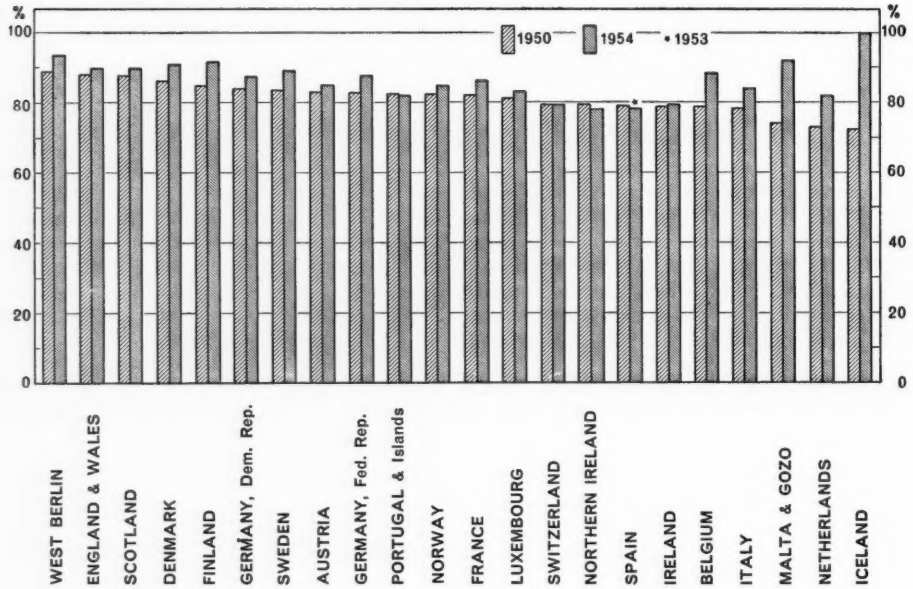


FIG. 2. DEATHS FROM TUBERCULOSIS OF THE RESPIRATORY SYSTEM AS PERCENTAGE OF TOTAL TUBERCULOSIS MORTALITY IN EUROPE, 1950 AND 1954



lity rate rises sharply at puberty, and may continue to rise up to the age of 25 years and over according to the country. The peak is generally reached towards adulthood and sometimes during old age.

It is also interesting to note the decrease in mortality from tuberculosis in relation to general mortality for the period in question. Although it is still one of the ten principal causes of death, tuberculosis is no longer responsible for such a large proportion of general mortality as are heart diseases, cancer, diseases of early infancy, or accidents.

According to the statistics published by WHO (see Fig. 1), the ratio of tuberculosis mortality to general mortality varied from 1.5% in Denmark to 11.7% in Portugal for 1950, and from 0.9% in Denmark and Iceland to 5.6% in Portugal for 1954. It is true, of course, that—systems of notification of causes of death not yet being perfect—there is a certain margin of error. This margin is represented by the percentage of total deaths which is classified under the headings " Unknown cause " and " Senility ". There is no doubt that some deaths from chronic tuberculosis among old people have been classified under " Senility ". It should also be noted that the tuberculosis mortality rate is higher among men than among women and that this difference becomes more marked with every year of age, as the statistics for the countries studied show.

Of the various forms of the disease, tuberculosis of the respiratory system (pulmonary tuberculosis, in particular) is still the principal cause of death. The percentage of deaths from tuberculosis of the respiratory system in relation to deaths from all forms of tuberculosis varied in 1950 from 72.4 in Iceland to 89.1 in West Berlin (see Fig. 2). In 1954, the percentage rose everywhere except in Northern Ireland, Portugal, Spain

and Switzerland and it was higher for men than for women.

The general situation with regard to mortality from tuberculosis of the respiratory system for the years 1950-55 may be summarized as follows: in infants under 1 year, mortality was fairly high; in the 5-14-year age-groups it was very low; after 15 years, and particularly after 20 years, the rate rose. Before the Second World War, the peak rate of mortality from tuberculosis of the respiratory system (particularly pulmonary tuberculosis) occurred between the ages of 20 and 30 years among women, and between 40 and 55 years of age among men. At the present time, the highest rate is observed among even older persons (over 60 years) for both men and women.

Once again, the statistics show that there has been a very marked decrease, regardless of age, in mortality from tuberculosis of the respiratory system.

Reports of Expert Groups

MATERNAL AND CHILD HEALTH SERVICES

" In recent years, there has been an unprecedented expansion of MCH [maternal and child health] activities in all parts of the world. The very rapidity with which new programmes have been developed has impelled administrators to initiate new activities which have as yet been untried in their communities . . . As the size and complexity of modern programmes increases, the need is being felt to substitute sounder, more scientific and business-like methods for the idealistic and haphazard approach of the early pioneers whose enthusiasm made up [for the lack] of administrative skills."

The development of a comprehensive MCH programme and the integration of MCH activities into the general public health and medical services are discussed in the second report of the WHO Expert Committee on Maternal and Child Health.[1]

Principles of programme planning, organization and structure of MCH services and techniques of administration are examined.

Finally, the role of evaluation and the MCH problems needing further research are considered.

[1] *Wld Hlth Org. Techn. Rep. Ser.*, 1957, 115. 28 pages. Price: 1/9, $0.30, Sw. fr. 1.—. Published in English, French, and Spanish.

ADDICTION-PRODUCING DRUGS

In the seventh report of the WHO Expert Committee on Addiction-Producing Drugs [1] it is recommended that the following morphine-like synthetic substances of pethidine type be considered addiction-producing drugs and therefore subjected to the relevant international control : 1-[2-(*p*-aminophenyl)-ethyl]- 4-phenylpiperidine-4-carboxylic acid ethyl ester and α-1-methyl-3-ethyl-4-phenyl-4-propionoxypiperidine.

The report also deals with several matters of general interest. *Inter alia*, the Committee suggested that WHO should study the possibility of organizing, as an adjunct to the technical assistance for narcotics control, symposia or seminars on various problems of drug addiction and addiction-producing

[1] *Wld Hlth Org. Techn. Rep. Ser.*, 1957, 116. 15 pages. Price: 1/9, $0.30, Sw. fr. 1.—. Published in English, French, and Spanish.

drugs. In addition, the Committee was of the opinion that the time was ripe for emphasizing again the distinction between addiction and habit, and approved the definition of certain characteristics of drug habituation.

The abuse of amphetamines is still a serious problem, even in Japan where the position has improved. Consequently, governments should provide adequate measures of control to prevent any abusive use of such substances.

In view of the fact that the situation concerning the abuse of barbiturates has not ameliorated, the Committee was of the opinion that control measures at the national level are necessary.

Finally, the attention of the Committee was drawn to the excessive consumption of drugs known as "tranquilizers" and "ataraxics". It is considered that these substances are potentially habit-forming; for this reason their use should be subjected to the same control measures as that of the barbiturates.

Notes and News

Research on deprivation of maternal care

The Research Unit of the Tavistock Clinic and Tavistock Institute of Human Relations, London, has been engaged for a number of years in research into the ill effects on the child's development of deprivation of maternal care. The World Health Organization, through its Regional Office for Europe, and the International Children's Centre have both taken an interest in the work of this Unit and have provided grants covering about half the cost during the five-year period 1951-55. The director of these studies, Dr John Bowlby—whose earlier connexion with WHO resulted in the well-received monograph *Maternal care and mental health* [1]—has just submitted a report to WHO reviewing the research work undertaken during these five years. Dr Bowlby acknowledges the Unit's great indebtedness to both WHO and the Centre for supporting the work during its early phases, at a time when recognition of its importance was still limited. Help from other sources, which has since been forthcoming, will enable the work to progress on an expanded scale during the years 1957-61.

As a starting point, the Research Unit held as proved that separation from the mother endangers mental health, and its efforts have been concentrated on defining the influence of the many factors brought into play, on elucidating the psychological processes involved, and on establishing the consequences to the developing personality of various kinds of separation experience. All these investigations have an obvious significance for preventive mental health work.

Dr Bowlby reports that, despite the progress which has been made during the five years under review, the Unit is still far from having established in detail the consequences of various kinds of separation experience. The work undertaken falls under four main heads:

(1) Studies of the emotional responses of infants and young children during the time of separation and soon after their return home;

(2) Studies of the later personality development of children who have experienced a prolonged separation in early childhood;

(3) An evaluation of different research strategies for use in studying the problem; and

[1] Bowlby, J. (1952) *Maternal care and mental health*, 2nd ed., Geneva (*World Health Organization: Monograph Series*, No. 2). This is a study of the mental health aspects of the problem of homeless children. It provides abundant information on the question—extremely important for the later development of the child—of the care given by parents during the first years of life. The author illustrates the importance of directing efforts towards improving the care given within the family—even an imperfect or substitute one—in preference to institutional care.

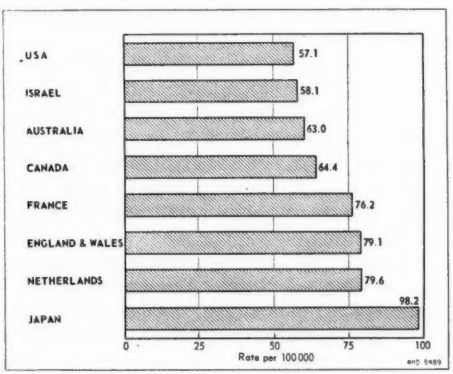
(4) Informing professional colleagues of the nature of the problems presented and joint consideration of means of obviating or mitigating the severity of the experience.

The work done has served abundantly to confirm the Unit's main thesis, namely, that infants and young children should never be separated from the parents until every alternative measure has proved impracticable; that where a child has to be removed, he must be provided with a substitute mother to whom he may look for security until he can return home; and that, during the interlude, frequent and regular contact between child and parent is to be encouraged. The more interesting of the specific findings are: (1) that a small but significant proportion of children exposed to the risk of prolonged separation sustain serious damage, which in many cases may be very grave; and (2) that research should now be aimed chiefly at exploring the variety of conditions which seem to affect responses to separation, together with direct observation of the nature of these responses.

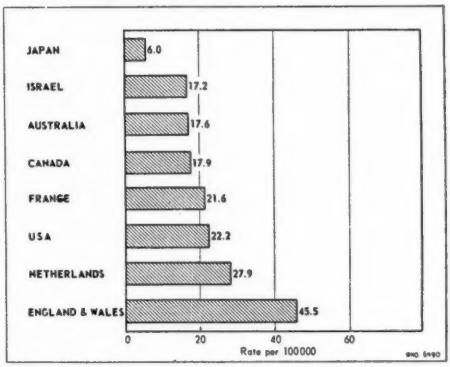
Variations in cancer mortality

Differences between countries in the mortality from cancer, in various sites, have baffled pathologists for a long time. Among the unexplained differences are those observed

AGE-ADJUSTED MORTALITY RATES FOR CANCER OF THE DIGESTIVE ORGANS IN MALES



AGE-ADJUSTED MORTALITY RATES FOR CANCER OF THE RESPIRATORY SYSTEM IN MALES



in Japan, where the number of deaths from both cancer of the digestive organs and cancer of the uterus is higher than that recorded in Australia, Canada, England and Wales, Israel, the Netherlands and the USA. On the other hand, mortality from cancer of the respiratory system in males in Japan is lower than in any of the seven other countries. Of all the eight countries, England and Wales have the highest death-rates from cancer of the respiratory system, but the death-rates from cancer of the breast and cancer of the male genital organs are surprisingly low in Japan, as are those from cancer of the uterus in Israel.

These conclusions can be drawn from a recent statistical study prepared by A. J. Phillips and Margaret Owchar published in Volume 16, No. 2 of the *Bulletin of the World Health Organization*. This study is particularly concerned with cancer in the following sites: buccal cavity and pharynx, digestive organs and peritoneum, respiratory system, breast (female), uterus, genital organs (male) and urinary organs.

Field difficulties in malaria eradication

Some of the difficulties encountered in eradicating malaria in the more remote areas of the world are well illustrated by the methods which have had to be adopted in

certain parts of Sarawak, where the Government is actively conducting an eradication campaign with the help of WHO and the United Nations Expanded Programme of Technical Assistance. In this country, only a little smaller than England, the roads are almost entirely confined to the coastal towns and settlements, and travel in the interior is made on foot through the jungle or by prahu along the innumerable rivers. However, the prahu, a wooden canoe, is not ideal for all the conditions met on the waterways of Sarawak, and one WHO entomologist, François Lachance, has found it necessary to turn his hand to boat-building, designing a speedboat for the larger rivers and a flat-bottomed boat for the shallow tributaries, which the deeper-draught prahu cannot negotiate.

But even this inventiveness will not serve to get supplies into the remote jungle areas away from the rivers. One such area is the Kelabit plateau of about 1000 square miles near the border of Sarawak and Indonesian Borneo. In order to make eradication operations possible, Dr. Michael Colbourne, a WHO malariologist who is the leader of the Sarawak Malaria Project, and Dr. W. Glyn Evans, Director of Medical Services of the Sarawak Government, recently arranged with the Royal Air Force at Singapore for some 30 bags of DDT and medical supplies to be dropped by parachute at Bareo, on the Kelabit plateau, where a WHO malaria control team was waiting. A similar airdrop had been organized in 1954 in Lio Matu at the headwaters of the Baram river. This has proved to be the only effective means of getting supplies to the inaccessible parts of the country; just how inaccessible they can be is shown by the fact that it took the team conducting the spraying operation on the Kelabit plateau 18 days of river travel and jungle trekking to reach the airdrop area.

It will take them about six weeks to spray the villages in the district with insecticide, but it is expected that their efforts will meet with considerable success as the effectiveness of residual spraying in controlling the Sarawak malaria vector, *Anopheles leucosphyrus*, has already been clearly demonstrated.

Eradicating murine typhus fever

Murine typus fever is endemic in those regions of the United States of America which have an average January temperature of above 40°F and an average relative humidity of 37% in July. Although it is now unknown in most towns, the disease still persists in scattered foci on isolated farms and agricultural premises. Some 5000 cases of murine typhus were notified in the United States in 1945, but this figure should probably be doubled to allow for unreported cases. On the other hand in 1954 only about 200 cases were reported.

The control of rats and their ectoparasites —the fleas which carry the disease—certainly played a large part in this decrease. Indeed, it is in those counties which apply rodenticides and pulicides, in accordance with the programme undertaken by the US Public Health Service and State health agencies, that the decrease has been most pronounced.

A systematic and controlled test of the feasibility of eradication by using anticoagulants against rats, and DDT against fleas, was carried out in 1953-54 in the southeastern part of Grady County, Georgia, and is described by C. O. Mohr and W. W. Smith in the *Bulletin of the World Health Organization* (1956, Vol. 16, No. 2). Before the commencement of the campaign it was estimated that 50% of the 713 agricultural premises in the area were rat-infested. Typhus fever antibodies were found in rats trapped in 63% of these premises, and 44% of the rats examined gave positive serological tests for the disease.

In the course of the ten months covered by the campaign, rats disappeared from 89% of the infested premises. This result was achieved by using about 2 kg of DDT dust and some 5 kg of poisoned bait for every building, at a cost of $20. An average of 88 days was necessary to obtain an effective result for each building.

This treatment also considerably reduced the number of fleas (*Xenopsylla cheopis, Echidnophaga gallinacea, Polyplax spinulosa*). Although the rats again invaded about 25% of the same premises in the course of a period

of 18 months, murine typhus seems to have disappeared from the area, as the rat and flea population no longer reaches the minimum level necessary for the maintenance of the disease.

It is probable that similar measures could be successfully applied for the eradication of murine plague occurring in commensal rodents, since this disease is also maintained in rats by infestation of *Xenopsylla cheopis*.

Seminar on mentally handicapped children

An international seminar on the mental health of the subnormal child will be held in Oslo from 25 April to 3 May 1957. The meeting has been arranged by the Regional Office for Europe of the World Health Organization in co-operation with the Norwegian Government and the European Office of the United Nations Technical Assistance Administration.

The seminar will be concerned with general positive measures to improve mental health and the attitude of families so that mentally handicapped children may benefit to the fullest extent from education, find useful employment and eventually take their place in the community.

It will be attended by public health administrators, child psychiatrists, paediatricians, psychologists, medico-social workers and educators. Participants have been invited from the following 13 countries: Austria, Denmark, Finland, Federal Republic of Germany, Iceland, Ireland, the Netherlands, Norway, Poland, Sweden, Switzerland, the United Kingdom and Yugoslavia. There will be about 40 participants in all.

The purpose of this meeting is to spread knowledge of modern practices relating to mentally handicapped children. Among the topics that will be discussed are: the number of mentally handicapped children and the services provided for them; the detection of mental handicap; the needs of parents whose children are thus handicapped; social work for these children and their families; educational problems and employment.

Regional training course on rabies

The Regional Training Course on Rabies, to be held in Caracas, Venezuela, from 31 March to 13 April, is the third of its kind organized by WHO to serve different regions of the world. The first course was held in Coonoor, India, in July 1952 and was attended by 55 rabies workers from 23 countries of the Western Pacific, South-East Asia and Eastern Mediterranean Regions. The second course was held in Muguga, Kenya, and was attended by 40 representatives from 22 African countries. It is anticipated that approximately 40 rabies workers from 18 countries of Latin America will attend the Caracas meeting.

The purpose of these meetings is to provide the latest information on the prevention and control of rabies in both man and animals. The meetings fulfil an additional function in promoting the adoption of more uniform techniques and principles in important aspects of rabies, so that work accomplished in different parts of the world will have more satisfactory bases of comparison than has been the case until now.

In most of the Latin American countries rabies is a severe problem. Although the dog continues to be the principal reservoir of the disease in the majority of these countries, the problem of rabies in bats is of great public health and economic importance. For over 50 years it has been known that vampire bats can transmit rabies to animals, and in the past few years these observations have extended to insect-eating bats on the North American continent. Human beings have been exposed to the bites of rabid bats and deaths have often resulted. Economically, rabies transmitted by vampire bats is very important in live-stock producing countries, such as Brazil and Mexico, and each year hundreds of thousands of animals have to be inoculated to forestall the great losses which would otherwise result.

The meeting in Caracas will be held at the National Institute of Hygiene. The discussion leaders will include several of the outstanding world authorities on rabies, including Dr Karl Habel of the National

Institutes of Health, Bethesda, Md.; Dr Hilary Koprowski, Assistant Director of Viral and Rickettsial Research, Lederle Laboratories, New York; Dr E. S. Tierkel, Veterinary Public Health Division, United States Public Health Service, Communicable Disease Center, Atlanta, Ga.; Dr Jordi Casals, Rockefeller Foundation Virus Laboratories, New York; and Dr C. F. Pait of the City of Los Angeles Department of Health. These discussion leaders will be assisted by medical and veterinary specialists of the Pan American Sanitary Bureau (which acts as WHO Regional Office for the Americas). The meetings will consist of lectures and discussions in the morning, followed by laboratory sessions in the afternoon, during which the representatives from the various countries will work on diagnostic procedures and the production and potency-testing of vaccines and serum, under the close supervision of the discussion leaders. The discussions will include full consideration of the problems of field control involving dogs, domestic livestock and wild life.

This meeting is part of a long-range programme being carried out by the Pan American Sanitary Bureau on rabies control activities in Latin America.

Seminar on the nurse in industry

There is general agreement that the nurse has an important role to play in connexion with the health and welfare of the worker. Indeed in those countries where her value has been fully recognized, the nurse working in industry not only deals with emergency and primary treatment of accidents and illnesses and the maintenance of records and statistics, but also has duties in connexion with pre-placement and other medical examinations, arranging follow-up treatment, health education and counselling. At the same time she assists in the supervision of factory hygiene and accident prevention, and cooperates with the various community health services to which workers may be referred.

Investigations and consultations within the European Region have revealed that, due mostly to economic difficulties, lack of understanding or shortage of training facilities, the industrial nurse is often neither adequately trained nor properly utilized in industry.

These considerations led ILO and the Regional Office for Europe of WHO to organize a seminar in 1957 with the object of collecting more information on what is done in this field at the national level, facilitating exchange of experience, stimulating the establishment and the development of services and discussing the required educational programmes.

The meeting, thanks to the hospitality offered by the Government of the United Kingdom, will be held in London, from 25 April to 4 May 1957. Its agenda will include: implications of the industrial environment on the basic health and welfare needs of the worker; personnel concerned with health and welfare needs in industry; scope of industrial nursing; scope of industrial social work; functions of the industrial nurse working with or without an industrial medical officer; differences in requirements for nursing services according to the size of the factory and the type of industry; nurse relationships in the factory; liaison and coordination of industrial nursing service with health, social and welfare services provided for the community; and professional education of the industrial nurse: basic, post-basic, and supplementary.

In order to obtain the widest possible variety of opinion, the seminar will bring together industrial nurses, social workers, industrial medical officers, medical officers of health, and medical inspectors of factories from 15 European countries. A questionnaire has been sent in advance to the participants with a view to discovering similarities and differences in the practice of industrial nursing and in the background against which the work is carried out.

Participating countries will be: Belgium, Bulgaria, Czechoslovakia, Finland, France, Germany (Federal Republic), Italy, Luxembourg, Netherlands, Norway, Poland, Sweden, Switzerland, United Kingdom, and

Yugoslavia. The following experts have been invited to participate at the meeting as lecturers: Mrs I. G. Doherty, Secretary to the Occupational Health Section, The Royal College of Nursing, London: Professor Sven Forssman, President of the Permanent International Commission of Industrial Medicine, Stockholm; Dr J.-J. Gillon, Médecin Inspecteur Général de la Médecine du Travail et de la Main-d'œuvre, Paris; M^lle M.-L. Ginet, Assistante-conseil auprès de la Compagnie des Industries des Textiles artificiels et synthétiques, Paris; Professor R. E. Lane, Nuffield, Professor of Occupational Health, University of Manchester, Manchester; M^lle Gh. van Massenhove, Infirmière-chef, Union Chimique Belge, Bruxelles; Dr Llywelyn Roberts, Medical Officer of Health, Sheffield; Miss Ruth Säynäjärvi, Industrial Nursing Consultant, Institute of Occupational Health, Helsinki.

Expert committee on yellow fever vaccine

Under the International Sanitary Regulations, which came into force on 1 October 1952, an international certificate of vaccination against yellow fever is valid only if the vaccine used has been approved by WHO. The standards to which yellow fever vaccine was to conform were specified by UNRRA and dealt with the preparation, preservation and administration of the vaccine. These standards were published in 1945 in the UNRRA *Epidemiological Information Bulletin* under the title *Standards for the Manufacture and Control of Yellow Fever Vaccine*; they were subsequently adopted by WHO and are still in force. It is now generally felt that although the UNRRA Standards have served a useful purpose over the past years, there is a need to reconsider them in order to bring them up to date with recent developments.

The Expert Committee on Yellow Fever Vaccine, which will meet in Geneva from 8 to 13 April 1957, will be studying technical questions concerning these Standards and a number of related laboratory problems. It is, for instance, of particular importance that the yellow fever virus strains which are used for vaccine production should maintain their ability to confer immunity to yellow fever in vaccinated people without causing harmful side-reactions. It is felt that wider international collaboration could help to ensure this. One particular problem the committee will be discussing in this connexion is that of encephalitis, the most feared side-reaction to which yellow fever vaccination may give rise.

Another important matter to be considered by the committee is how to make certain that the methods used to check the immunity resulting from vaccination give comparable and reproducible results; it would be desirable to achieve international co-operation on this subject. The most common method of checking immunity is to show by the mouse protection test that the vaccination stimulates antibody production in the blood serum, and it is hoped that a way may be found to ensure that the results obtained with this test in different laboratories can be compared.

The following experts have been invited to attend: Dr F. N. Macnamara, Director of the Western African Council for Medical Research Laboratories, Yaba, Lagos, Nigeria; Dr Rumeno Isaac Diaz, Médico Jefe de la Division de Fiebre Amarilla y Peste, Ministerio de Sanidad y Asistencia Social, Caracas, Venezuela; Dr P. Lépine, Chef de Service, Institut Pasteur, Paris, France; Professeur J. Laigret, Directeur de l'Institut d'Hygiène et de Bactériologie, Université de Strasbourg, Strasbourg, France; Dr A. Gast-Galvis, Directeur, Instituto de Estudios Especiales Carlos Finlay, Bogotá, Colombia; Dr K. C. Smithburn, The Rockefeller Foundation, Johannesburg, Union of South Africa.

Malaria conference in Belgrade

Malaria eradication in south-eastern and eastern Europe will be discussed at a conference to be held in Belgrade from 26 to 29 March 1957. The meeting, which is sponsored by the Government of Yugoslavia

and the WHO Regional Office for Europe, will continue the work of the Malaria Conference held in Belgrade in December 1955.[1] Representatives of Albania, Bulgaria, Greece, Romania, Turkey, USSR, and Yugoslavia will attend. The recommendations made by the Athens Inter-Regional Malaria Conference in June 1956 will also serve as background to the forthcoming meeting in Belgrade.

In most of south-eastern Europe, malaria has been greatly reduced and eradication of the disease throughout the area is a practical possibility. An essential condition for eradication is close international co-operation—information on remaining pockets of malaria, on the control methods used and on mosquito resistance to insecticides needs to be continuously exchanged between countries, and well co-ordinated operations are required, at the very least in infected districts crossed by international boundaries. The forthcoming conference will review the progress achieved nationally in the various countries and will discuss the international aspects of malaria in south-eastern Europe, particularly in the light of the recommendations made in 1955. These include intensified exchange of information, the extension of bilateral agreements, the establishment of "protective zones" of about 20-km depth along frontiers, and the adoption of uniform methods for determining the resistance of insects to insecticides. Information will also be exchanged on the latest technical developments in anti-malaria work. At the request of the Bulgarian Government, discussion will bear on the establishment of a joint plan for combating malaria in all the countries participating in the conference.

[1] See *Chron. Wld Hlth Org.*, 1956, **10**, 73

Death of Dr John Friend Mahoney

The death of Dr John Friend Mahoney in New York in February will be deeply regretted both by his colleagues in the venereal disease field and by public health workers everywhere.

John Mahoney was born at Fond du Lac, Wisconsin, USA, on 1 August 1889, and graduated as an M.D. from Marquette University, Milwaukee, in 1914. Soon afterwards he became a student of Professor Hoffmann in Germany, where he participated in studies on experimental syphilis. From that time he devoted himself to the laboratory aspects of the venereal diseases, and as an officer of the United States Public Health Service was in charge of the Venereal Disease Research Laboratory, Marine Hospital, Staten Island, N.Y. It was there that the now universally accepted serological test—the VDRL test—was developed under his guidance.

Dr Mahoney will also be remembered in medical history for his discovery of the effectiveness of penicillin therapy in syphilis. His paper published in 1943 was the first of a series which later developments have shown to be the basis of a revolution in therapy, not only of venereal syphilis but also of the endemic treponematoses—yaws, bejel, and pinta. The introduction of long-acting penicillin preparations, given in curative doses in single injections, has made possible mass attacks against the treponematoses, which are of economic importance in many under-developed parts of the world.

Dr Mahoney was intimately associated with WHO in its treponematosis control programme from the very first stages, and on several occasions was chairman of the WHO Expert Committee on Venereal Infections and Treponematoses. Through his consultant activities with WHO and other international organizations he exerted a profound influence on the orientation of venereal disease control programmes in many countries of the world.

Specifications for pesticides

Corrigenda to the recently-issued WHO publication [1] on this subject are now available and can be obtained free of charge on request to the World Health Organization,

[1] *Specifications for Pesticides: insecticides, rodenticides, molluscicides, and spraying and dusting apparatus.* Geneva (World Health Organization). 400 pages, 22 figures, 4 tables. Price: £2, $8.00, or Sw. fr. 24.— (cloth-bound)

Palais des Nations, Geneva, Switzerland. This publication contains the various specifications established by the WHO Expert Committee on Insecticides at its second, third, fourth, fifth, and sixth sessions for the various pesticides against vectors of diseases of man and for apparatus for applying those pesticides.

People and Places

Malaria Eradication in Latin America

The first meeting of the Directors of the Malaria Eradication Services of Argentina, Bolivia, Brazil, Paraguay, and Peru was held recently in Cochabamba, Bolivia. This meeting, which was convened jointly by the Bolivian Government and the Pan American Sanitary Bureau (which acts as WHO Regional Office for the Americas), provided an opportunity for the participants to report on the progress made in their respective campaigns and to discuss the problems which have arisen—the latter being of particular value for future operations. Three similar meetings in recent years have received organizational help from PASB/WHO.

Fourth River Plate Frontier Health Meeting

Brazil was the host country to the Fourth River Plate Frontier Health Meeting, which took place recently in Porto Alegre, under the sponsorship of the Pan American Sanitary Bureau (which acts as WHO Regional Office for the Americas). These meetings are held in accordance with the Pan American Sanitary Agreement of 13 March 1948, of which Argentina, Brazil, Paraguay, and Uruguay are the signatories. The four countries recognized, by this Agreement, the necessity of co-ordinating permanent preventive measures in respect of the many epidemiological problems common to their adjoining border regions.

The three earlier meetings were held in Salta, Argentina, in March 1948, Montevideo, in July 1953, and Asunción in August 1955. The discussions at this particular meeting covered a wide range of subjects, including such important health problems as malaria, smallpox, hydatidosis and poliomyelitis.

The value of the area approach to common problems has been well illustrated by the results of these periodic gatherings. Other similar border health agreements exist; notably, those of May 1946, between Bolivia, Chile and Peru, and of March 1948, between Argentina, Bolivia and Paraguay. Mexico and the USA have collaborated on border health problems since the days of the Second World War.

Drug Control Consultant, Brazil

The Brazilian Government recently decided to establish a Federal Drug Control Laboratory and Service, which will be responsible for the application of appropriate controls on all drugs offered for sale in the country.

The help of the Pan American Sanitary Bureau (which acts as WHO Regional Office for the Americas) was sought in developing this service, and Mr. Leslie Hart, of the United States of America, who served for many years in his country's Food and Drug Administration, has been appointed as a consultant to the Brazilian Government. Mr Hart's function is to advise the Director of the Service, Dr Raymundo Moniz de Aragão, on such matters as the establishment and operation of the laboratory, the development of field services, and the review and preparation of drug control legislation. Advising on drug control services is a relatively new departure for PASB/WHO. Mr Hart took up his duties in Brazil in January of this year.

Nursing training in Argentina

PASB/WHO officials have been assisting the Argentine Government in surveying that country's needs as regards nursing training. At the Government's request, the Organization has now assigned a consultant in nursing education, Miss Blanche Schnebly, to assist in the reorganization of the Cordoba University School of Nursing. The Organization has also made provision for the granting of fellowships to selected candidates, so as to help in building up an adequate faculty. Requests for assistance to other university schools of nursing in Argentina are under consideration.

During the last decade, the development of hospitals and other health services in Argentina has far outpaced the supply of nurses. It is estimated that some 8000 additional graduate nurses are required to fill pressing needs. Even more urgent is the creation of a corps of nurses capable of assuming teaching, supervisory and administrative functions.

New assignments

The Pan American Sanitary Bureau (which acts as WHO Regional Office for the Americas) recently

appointed Dr Oswaldo da Costa, of Brazil, as its zone representative for Central America and Panama, in succession to Dr Stanford F. Farnsworth. The zone office, which is one of six such offices established for the purpose of decentralizing the Organization's work in the Americas, is located in Guatemala City. Dr da Costa will be responsible for co-ordinating all PASB/WHO activities in British Honduras, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, and Panama.

Prior to joining the PASB/WHO staff in 1951, Dr da Costa served as a federal health officer in his own country's national Department of Health. His first appointment with the Organization was as a medical officer in the Health Promotion Branch in Washington. He subsequently served as chief of that branch and later as WHO medical adviser to the UNICEF Latin American Regional Office in Lima, Peru.

Dr Farnsworth has replaced Dr John D. Cottrell —who has been transferred to the WHO Regional Office for Europe—as Director of Health Services for the Eastern Mediterranean region. His career, prior to taking up full-time international work in 1952, included nine years' service with the California State Health Department and a further 10 years as health officer for the city of Oakland, Calif. In addition, Dr Farnsworth has made a number of health surveys for various municipalities and health agencies, including the United States Public Health Service and the World Health Organization; in 1950-51, he visited Egypt on the latter's behalf.

Malaria field appointments

The appointment has just been announced of Dr Gerardo L. Adan, of the Philippines, to the staff of the international team now engaged in assisting the Government of Haiti in its malaria and *Aëdes aegypti* eradication campaigns.

Dr Adan, who was previously the Philippine Government's "counterpart" to the WHO malaria control team leader in the Philippines, is taking over the direction of the team in Haiti. He will have his headquarters in Port-au-Prince.

Another recruit for work in this domain is Dr Juan A. Montalvan Cornejo, of Ecuador. Dr Montalvan, a medical officer trained at the University of Guayaquil and the Johns Hopkins Medical School, USA, is to help the Government of the Dominican Republic in its current campaigns.

He was formerly Director of his own country's National Institute of Hygiene and Chief of the National Antimalaria Services. In addition, he held the post of professor of tropical medicine at the University of Guayaquil and has also been a member of the WHO Expert Committee on Public Health Administration.

Pan American Foot and Mouth Disease Center

Dr William MacGregor Henderson, of the United Kingdom, is the new Director of the Pan American Foot and Mouth Disease Center at São Bento, near Rio de Janeiro, Brazil. This centre, which serves the whole of the Americas Region, was established in 1951. It trains national laboratory and field staff for the control of foot and mouth disease and provides research facilities and consultative and diagnostic services.

Dr Henderson succeeds Dr Ervin A. Eichborn, who resigned last year to return to the United States. He is a doctor of science of Edinburgh University and a member of the Royal College of Veterinary Surgeons. Prior to taking up his new appointment, he was Deputy Director of the Research Institute (Animal Virus Diseases), Pirbright, England.

Dr Henderson is well known for his work on virus estimation. The method of virus estimation, given in his book *Quantitative Study of Foot and Mouth Disease* and known by his name, is in wide use in research institutes.

Pan American Zoonoses Center

Dr Victor Bravo Moya, of Chile, has recently taken up his new duties as Chief of Laboratories of the Pan American Zoonoses Center at Azul, Argentina. In this capacity, he is responsible for organizing and supervising all laboratory phases of the centre's programme.

Dr Moya, who is an M.D. of the University of Chile and an M.P.H. of the University of Michigan, USA, was formerly Assistant Chief of the Departmental Laboratory of the Bacteriological Institute of Chile, and Assistant Professor in the School of Public Health and Professor of Bacteriology in the School of Nursing, Santiago.

Organization of Public Health Services

The assistance PASB/WHO is now giving to the Bolivian Government in developing health services has been expanded recently by the appointment of Dr Ulpiano Blanco, of Argentina, to work in La Paz, in co-operation with international nursing and sanitary engineering staff. Dr Blanco is a medical officer who took his training at the University of the Littoral, Rosario, and the Johns Hopkins Medical School, USA. He was on the staff of the Argentine Health Services from 1943 onwards, serving most recently as a Regional Sub-Director of Public Health.

Another aspect of WHO's work for the strengthening of public health services is represented by the appointment of Mr Manuel S. P. Carrera, a public health engineer, for duty with the international team currently assisting the Venezuelan Ministry of Public Health to set up a well-balanced unit of rural health services in the Tuy River Valley.

Mr Carrera has been engaged in sanitary engineering work in Salvador, Bahia, Brazil, since 1944; in 1954, he took over the post of professor of environmental sanitation in the Bahia School of Medicine, in addition to his other duties.

Indian malariologist for Indonesia

Dr Devraj Mehta, formerly Punjab State Malariologist, has recently taken up his new appointment as WHO malariologist with the Government of Indonesia.

Dr Mehta will assist the Indonesian Government in strengthening the malaria section of the Central Health Directorate in Djakarta and in the establishment of an institute for training personnel in the control of malaria and other insect-borne diseases.

He will join four WHO staff members already working in Indonesia under the Government's anti-malaria programme.

After taking his Ph.D. from Cambridge University, Dr Mehta carried out post-graduate work in malariology and entomology at the Harvard Medical School, and later as a Special Fellow of the Rockefeller Foundation at the Puerto Rico Field Experiment Station. Dr Mehta is a member of the WHO Expert Advisory Panel on Insecticides and of the Council of the National Society of India for Malaria and Other Mosquito-borne Diseases. He has also been a member of the Malaria Advisory Committee of the Indian Council of Medical Research.

WHO Headquarters

Mr H. C. Grant, Director of the WHO Division of Administrative Management and Personnel, has resigned with effect from 31 March 1957. As of 1 April 1957, Mr J. I. Armstrong, Chief of the Personnel Section, will assume the duties and responsibilities of Mr Grant's post.

Mr Grant was born in Canada in 1897 and was educated at the University of Manitoba (B.Sc., M.A.) and Stanford University, California (Ph.D.). He spent his early professional years in university teaching and research, leaving his post as professor of economics in 1941 to join the Canadian Army. From the termination of hostilities until joining the WHO staff in April 1949, he was engaged in private practice as a management consultant. He now plans to return to this form of work, making his home in Toronto, Canada.

Review of WHO Publications

TREPONEMATOSES

Bulletin of the World Health Organization, 1956, Volume 15, Number 6 (pages 863-1096).

Since the International Symposium on Yaws Control in Bangkok in 1952,[1] much practical experience has been gained in yaws campaigns in many parts of the world. It was upon knowledge derived from this experience and from careful field and laboratory work that the papers and discussions were based at the International Conference on Yaws Control held in Enugu, Eastern Region, Nigeria, in 1955. While all the papers prepared by participants to this second international conference contributed to its success, only a few of particular interest have been selected for publication in this issue of the *Bulletin*.

The general principles of yaws campaigns were set forth in the fourth report of the WHO Expert Committee on Venereal Infections and Treponematoses in 1952.[2] These

[1] World Health Organization (1953) *First International Symposium on Yaws Control*, Geneva (*World Health Organization: Monograph Series*, No. 15) (Originally published in *Bull. Wld Hlth Org.*, 1953, 8, 1-418).

[2] World Health Organization (1953) *Wld Hlth Org. tech. Rep. Ser.*, 63

principles and their general application in the field are brought together in the first paper in this number, entitled " Some Important Aspects of Yaws Eradication ", by C. J. Hackett and T. Guthe, for the guidance of all who are concerned with the planning and execution of such campaigns. This paper was not presented at the conference but serves to introduce the whole subject of treponematosis control. It offers recommendations which need to be adapted to the local conditions present in the field of operations, although the general principles will remain largely unchanged. Only those in the country concerned can know all the many details that are so essential for the efficient conduct of a mass campaign and it must be their responsibility to ensure that their special knowledge is made available and is employed in such activities.

A paper by G. E. Samame on the eradication campaign in Haiti emphasizes the practicability and importance of eradication as the purpose of the campaign. The great contributions of the Haitian workers are the careful organization and supervision of all stages of the work, the use of small doses of penicillin which were satisfactory in the conditions encountered, and—most important of all—the treatment not merely of the patients with active yaws but of the whole population where the prevalence of active yaws is high. The importance of this total mass treatment together with high coverage of the population at surveys is clearly demonstrated in the report by A. Zahra of the campaign in the Eastern Region of Nigeria, where the development of the rural health services has been hastened by the initial success of the yaws campaign.

In the Indonesian campaign patients alone were treated, since it was felt that local resources and conditions were not suitable for total mass treatment. However, by strengthening other aspects of the campaign, such as the invariable regularity of the resurveys every 6-8 months and the initial integration of the yaws campaign activities with the organization of the smallest semi-autonomous administrative unit, the sub-district, this very large campaign is steadily and successfully progressing. This campaign is reported on by M. Soetopo and co-authors.

A paper on two endemic treponematoses, endemic syphilis and yaws, by E. I. Grin, who has had extensive experience in campaigns against both diseases, stresses the many points they have in common, especially in their epidemiology.

In the tropical belt of Africa, where average temperatures and humidity are high, yaws is by far the most important epidemic treponematosis. However, in the more arid lands north and south of latitudes 12° N and 20° S approximately, yaws is replaced by non-venereal endemic syphilis. The study reported from Bechuanaland by J. F. Murray and others is a major contribution to this subject, and it supports the earlier work of Grin [3] in Bosnia and of other workers in Iraq.

The presence of syphilis in Uganda when the first European explorers arrived there has been discussed for many years. J. N. P. Davies' paper on the history of this question suggests that originally the treponematosis in Uganda was an endemic form which during the past half-century has been replaced by venereal syphilis.

The analysis by J. C. Hume and G. Facio of the clinical, microscopical and serological results following the use of single injections of small doses of procaine penicillin G in 2% aluminium monostearate (PAM) in the yaws campaign in Haiti is the first thorough study of this subject. This study reports the satisfactory results following a dose of 0.6 million units of PAM obtained in Haiti. The Haitian work has stimulated trials of the same dosage under different conditions elsewhere.

In the final paper, by C. A. Smith and others, it is shown that in the treatment of early syphilis a single dose of 2.4 or 2.5 million units of benzathine penicillin, which will maintain a detectable penicillin blood-level for up to four weeks, is at least as effective as 4.8 million units of PAM. It is stated that the occurrence of delayed reactions to penicillin

[3] Grin, E. I. (1953) *Epidemiology and control of endemic syphilis : report on a mass-treatment campaign in Bosnia*, Geneva (*World Health Organization : Monograph Series*, No. 11)

does not appear to be increased by the long-sustained penicillin blood-levels following the use of this newer preparation. This is of considerable interest for yaws campaigns, but at present the wide introduction of benzathine penicillin into these campaigns is limited by the higher cost of the drug.

Although much knowledge has been gained during the past few years, there are still a number of aspects of yaws that need further study. Among these are the transmission and the epidemiology of the disease as a whole and especially of the few cases that have been found in several areas to appear when the disease has been almost eradicated. Many campaigns are now reaching the stage when this problem is becoming manifest.

It is important that adequate rural health services be developed so that the surveillance needed ultimately to eradicate the disease can be carried out effectively and economically without embarrassing the progress of the campaign or the finances of the national health service. Such surveillance cannot be neglected unless the environmental conditions have been raised to a level where the transmission of yaws can no longer take place.

The International Conference on Yaws Control, held in Enugu, Nigeria, in 1955, was attended by over fifty health workers from most parts of the world where yaws occurs. One of the recommendations of the conference was that a co-ordinated attack on yaws throughout Africa should be undertaken. Thus the world-wide programme of yaws eradication has been extended from Asia to Africa, and a similar extension to the American continent is planned.

Bulletin of the World Health Organization, 1957, Volume 16, Number 1 (pages 1-246).

Much of this issue of the *Bulletin of the World Health Organization* is devoted to certain aspects of the control of insects which transmit disease. The contributions on this subject fall into two main groups: first, those dealing with problems arising out of the increasing resistance of disease vectors to chlorinated-hydrocarbon insecticides; and secondly, those dealing with improvements in, and standardization of, techniques for the practical application of insecticides, for the measurement of deposits, and for the detection of susceptibility or resistance to insecticides.

Many studies on the susceptibility of insect vectors to chlorinated hydrocarbons have been carried out since the first example of resistance—that of the housefly to DDT—was reported some ten years ago. For the most part, however, the investigations have been concentrated on resistance in houseflies and mosquitos, comparatively little attention having been given to the possible development of resistance in the body louse, the vector of typhus. The first paper in this issue, which details the results of a WHO-sponsored world-wide survey of the susceptibility of the body louse to DDT, BHC, and pyrethrins, is therefore of particular interest. The authors—J. W. Wright and A. W. A. Brown—show that whereas the vector remains almost normally susceptible to DDT in certain regions, such as Europe, in others—eastern Asia, the Levant, and parts of Africa—it has acquired a significant resistance. Resistance to BHC is present in Japan and possibly elsewhere. In contrast, the susceptibility to pyrethrins in the countries surveyed seems, with a few exceptions such as Japan, to be unimpaired at the present time. A notable feature of this global survey is that a WHO standard test for measuring resistance was used throughout, to ensure comparability of the results.

The development of resistance to the chlorinated hydrocarbons has stimulated research on the performance of other types of insecticide in vector-control programmes. Foremost among the possible substitutes are the organo-phosphorus compounds, which have a powerful insecticidal action and are generally considered likely to prove satisfactory in the field. It is disappointing, therefore, that the results of a recent American investigation—summarized by A. W. Lindquist in the second paper—have shown the usefulness of these compounds to be limited. While many of them are effective as residual sprays

against houseflies and culicine mosquitos, the deposits lose their efficacy more quickly than do those of DDT, so that they are unlikely to be as efficient for controlling anophelines.

The limited scope of the organo-phosphorus insecticides is not the only disadvantage from which these compounds suffer. Although certain of them are evidently quite safe, the organo-phosphorus compounds as a group are considerably more toxic to man than the chlorinated hydrocarbons. It is therefore probable that methods of application which have proved safe in the case of DDT would seriously endanger the health of the operators if they did not comply with the precautions recommended by experts for each insecticide concerned. In the third paper, J. M. Barnes, W. J. Hayes & K. Kay discuss the risks inherent in the use of the organo-phosphorus insecticides, describe the signs and symptoms of poisoning, and suggest ways in which the health hazards likely to arise might be controlled.

The importance of standardizing tests for measuring susceptibility or resistance to insecticides needs to be stressed. Several different techniques which have recently been developed for determining resistance in mosquito larvae are compared and evaluated by A. W. A. Brown in a short note, in which the desirable characteristics of a standard test are also summarized.

As to the mechanism of insecticide resistance, there are two factors of special interest to research workers: the degree of resistance acquired and the mode of inheritance, J. R. Busvine contributes two concise critiques of laboratory work on this subject—the first relating to the housefly and the second to *Drosophila*.

It is extremely important that the authorities responsible for carrying out vector-control programmes with residual insecticides should be able to find out readily whether the area sprayed has been completely covered by the insecticide and whether the deposit has remained effective since the last cycle of operations. This is particularly necessary in areas where the houses have mud walls, on which adsorption of the insecticide may take place. In the note by E. Paulini & S. Roubaud Reis, a new and simple colorimetric method for estimating DDT and BHC deposits on sprayed surfaces in the field is described.

The unreliability of some of the components of spraying apparatus is a frequent source of trouble during vector-control campaigns. Often, such parts as nozzles and pressure gauges become defective after a relatively short period of use in the field, and this results in decreased efficiency and increased costs of operation. Two notes by F. W. Knipe describe some investigations which have been carried out in India on spraying-apparatus components. In the first, the results of durability experiments on nozzle tips of different materials are presented. These results are encouraging: tips of the plastic material, polyethylene, were found to be as resistant to erosion as those of stainless steel, and have the advantage of being considerably cheaper to produce. In the second note, the author discusses the common causes of failure of pressure regulators and gauges, and suggests some ways in which their efficiency might be improved.

The effective dispersal of aerosols or solid particles of insecticides is one of the most pressing questions in a number of vector-control campaigns. At the present time, several methods for ensuring the satisfactory dissemination of particles of insecticide are available, but for technical or economic reasons few of them are universally applicable. The brief note by T. C. Helvey, however, describes two simple and inexpensive devices which can be used to distribute insecticides over all types of terrain—closely planted crops, hillsides, and unapproachable gorges, as well as rows of tall trees.

The control of body lice is at present almost entirely dependent on residual insecticides, but the apparatus normally available for dusting these materials over bedding and clothing is frequently unsatisfactory. This has led to extensive research on the design of dusting apparatus, and in the last note in this issue, S. H. Fryer describes a new

type of duster which has been developed in the United Kingdom with the express intention of overcoming the difficulties commonly encountered in anti-louse campaigns.

* * *

There are three other important contributions in the same issue of the *Bulletin*. The first describes the results of the last of a series of laboratory and field studies of dried smallpox vaccines undertaken on behalf of the World Health Organization. Initiated in 1952, the first studies were designed to determine the heat stability of certain commercially produced dried vaccines. This work was carried out at laboratories in Copenhagen, Elstree, and Paris, on vaccines produced in Austria, France, Indonesia, and the USA. It was found that while all the dried vaccines were more heat-resistant than the corresponding glycerinated lymph, one was markedly more resistant than the other three. This interesting result prompted a further investigation, in which a second batch of the highly resistant vaccine was compared with a vaccine that had given promising results in another unpublished study. It is the results of this investigation that are reported here, by W. C. Cockburn, R. M. Cross, A. W. Downie, K. R. Dumbell, C. Kaplan, D. McClean & A. M.-M. Payne. The investigation was designed by the authors to determine the stability of the vaccines, measured both in the laboratory and by success-rates in primary vaccinations in man, at temperatures likely to be met with in the tropics, and to define the relationship between the results of laboratory potency tests and those attained in man. The laboratory work was done in the United Kingdom at the Lister Institute for Preventive Medicine, Elstree, and at the University of Liverpool, and the field work was carried out through the co-operation of the Royal Air Force. The results showed one vaccine to be outstandingly stable, resisting 45°C for eight months—a period which has been extended since the report was prepared to two years, with no further significant deterioration. The great stability of this vaccine has led the WHO Expert Committee on Biological Standardization to initiate investigations as to the suitability of a vaccine prepared in this way for establishment as an International Reference Preparation. The method of preparation of the vaccine in question has already been published and recent modifications of the procedure are included in a summary of the method distributed by WHO. The use of such a vaccine should materially improve the prospects for controlling smallpox in hot countries. Another important result of the investigation is that a relationship between the findings in the laboratory and in man was determined, and this has made it possible to define a minimum titre at which a vaccine may be expected to give the highest possible number of successful vaccinations.

The second paper is by E. Grasset, who presents the results of a survey of the various methods used at present for the preparation and assay of antivenins in different countries. This work represents a valuable step towards the international standardization of antivenins. In this connexion, the author stresses the fact that the great variety in the antigenic constitution of venoms will make it necessary to establish several international standard antivenins, corresponding to groups of snakes which are characterized by venoms of the same or closely related constitution.

The final contribution, by R. Pollitzer, is the eighth of a series of studies on cholera which will eventually be published in the *World Health Organization: Monograph Series*. This particular study deals with the clinical pathology of the disease, covering all aspects from the loss of fluids and salts from the gastro-intestinal tract to the physical and chemical changes in the blood of cholera patients and the problems of circulatory and renal failure.

HYGIENE AND PUBLIC HEALTH TEACHING IN EUROPE

(Corrigendum)

The table entitled " Hygiene and Public Health Teaching in Nineteen European Countries ", published in the February number of the *Chronicle* (Vol. 11, No. 2, pp. 28-30), contains several errors concerning various countries. For instance, it would seem from the table that social medicine and occupational health are not taught in France. In fact, all medical faculties in France include hygiene, preventive medicine, social medicine and occupational health in their teaching programmes. Two certificates are granted:

(*a*) a certificate in hygiene and health welfare work, for students intending to enter the public health services; and

(*b*) a certificate in occupational health and industrial hygiene, for future industrial physicians.

In other cases, apparent errors may be explained by the fact that certain professorial chairs are not always given titles indicating all the subjects they cover. The chair of " hygiene ", for example, sometimes entails giving courses in social and preventive medicine.

Since the table does not give an exact picture of the situation in some countries, and in order to avoid any mistaken interpretation, the reader is referred to the monograph entitled *The Teaching of Hygiene and Public Health in Europe* by F. Grundy and J. M. Mackintosh (*World Health Organization : Monograph Series*, No. 34).